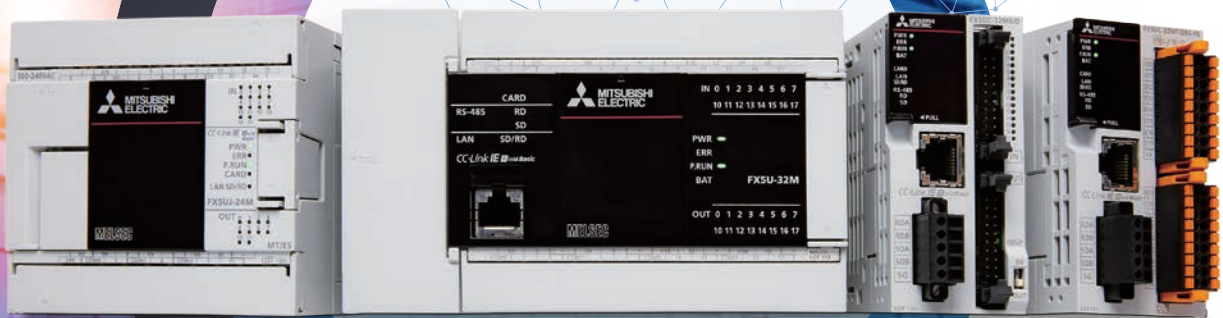Quick Start IoT Leaflet

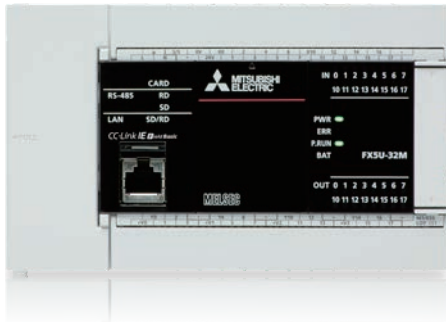# Quick Start **IoT** with **MELSEC iQ-F** series

| Connect | Monitor | Collect | Utilize |

Are you facing any problems introducing IoT to your facilities and equipment?

The MELSEC iQ-F series can help you get started easily and right away.

Screw terminal block type

Maximum number of control points	Program capacity	Pulse train	Up to
512* points	**64 k/128 k** steps	**200** kpps	**4** axes

FX5U
All-in-one model

As an all-rounder CPU, this module can help introducing IoT to facilities and equipments in any scenes.

High-speed counter function (Max. 8 ch)	Positioning function (Up to 4 axes)
Ethernet port	RS-485 port
SD memory card slot	Analog input/output

Screw terminal block type

Maximum number of control points	Program capacity	Pulse train	Up to
256 points	**48 k** steps	**200** kpps	**3** axes

FX5UJ
Model with USB (Mini-B) connector

Equipped with variety of built-in functions while demonstrating excellence in cost performance, this single module is recognized for its ease of use.

High-speed counter function (Max. 8 ch)	Positioning function (Up to 3 axes)
Ethernet port	USB (Mini-B) connector
SD memory card slot	

Spring clamp terminal block type

Maximum number of control points	Program capacity	Pulse train	Up to
512* points	**64 k/128 k** steps	**200** kpps	**4** axes

FX5UC
Vibration resistant/ maintenance-free model

Employs a spring clamp terminal block which strengthens vibration resistance and shortens wiring time.

High-speed counter function (Max. 8 ch)	Positioning function (Up to 4 axes)
Ethernet port	RS-485 port
SD memory card slot	

Connector type

FX5UC
Compact model

Because I/O connection is configured through external terminal block, this module can be located freely in any panel.

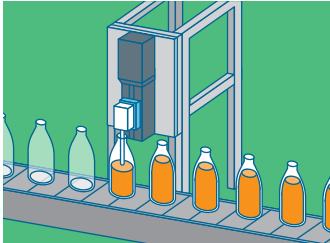|	
High-speed counter function (Max. 8 ch)	Positioning function (Up to 4 axes)
Ethernet port	RS-485 port
SD memory card slot	

*: It is the maximum number of control points including remote I/O points.

# 13 approaches that are possible with this small PLC!

Simple connection

1. To realize the visualization of your existing equipment with as little modifications as possible
2. To easily set and operate your actuators
3. To shorten process changeover time
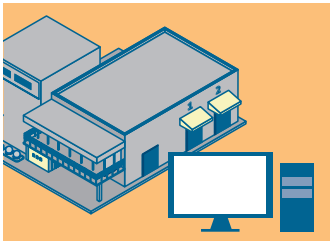
Data collection

4. To collect as much equipment logs as needed
5. To collect logs from remote sites together
6. To enable seamless data exchange between the high-level system and the connected devices
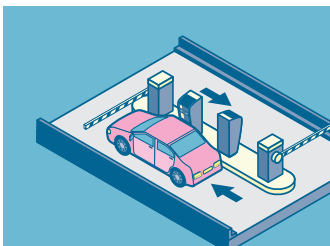
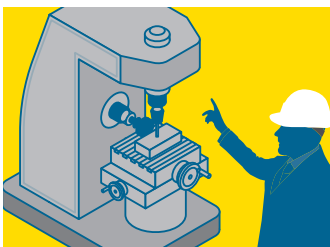## State visualization

7. To remotely monitor your equipment's states via mobile terminals
8. To directly monitor operation states on the site
9. To visualize the whole process
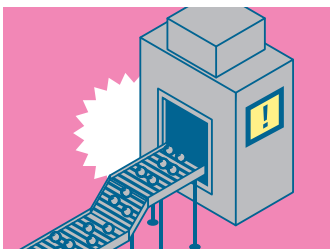
For analysis/troubleshooting

10. To perform predictive maintenance before any failure
11. To reduce debugging man-hours
12. To analyze the errors faster

More safely

13. To introduce safer controls to your equipment

1 To realize the visualization of your existing equipment with as little modifications as possible

On-site issues

- PLCs manufactured by different manufacturers are used for different equipment. It is troublesome to change the existing equipment's configuration.
- If I could manage multiple PLCs' data together while minimizing the required capital investment...

[Before introduction]

Company A programmable controller

Company B programmable controller

Company C programmable controller
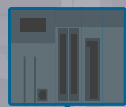
Input/output connection

Non-protocol connection

The system's configuration will become complicated...

I want to avoid large-scale equipment modification...
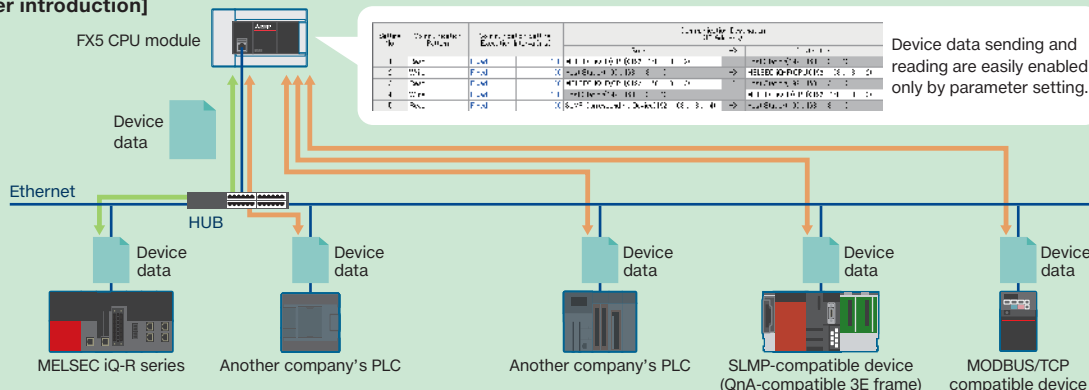
MELSEC iQ-F series solves your problems

Simple CPU communication function FX5U FX5UC FX5UJ

Quick Start

▌ Program-less! Simple communication will be possible with only parameter settings!

▌ Can be connected to not only PLCs manufactured by Mitsubishi Electric but also those manufactured by other companies.

[After introduction]

FX5 CPU module

Device data sending and reading are easily enabled only by parameter setting.

Device data

Ethernet

HUB

Device data

Device data

Device data

Device data

Device data

MELSEC iQ-R series

Another company's PLC

Another company's PLC

SLMP-compatible device (QnA-compatible 3E frame)

MODBUS/TCP compatible device

List of supported PLCs*1

Manufacturer	Supported PLCs
Mitsubishi Electric	MELSEC iQ-R series, MELSEC-Q series, MELSEC-L series, MELSEC iQ-F series, MELSEC-F (FX3) series
Siemens	S7-1200, S7-1500, S7-200SMART
OMRON	CJ1M-CPU1□-ETN, CJ2H-CPU6□-EIP, CJ2M-CPU3□, CJ1W-EIP21, CJ1W-ETN21, CP1L-E□
Panasonic	AFP0HC32ET, AFP0HC32EP, AFP7CPS41E, AFP7CPS31E, AFP7CPS41ES, AFP7CPS31ES, AFP7CCET1
KEYENCE	KV-8000, KV-7500, KV-XLE02, KV-NC1EP
—	SLMP-compatible device (QnA Compatible 3E Frame), MODBUS/TCP-compatible device

Benefits

▶ The only requirement is to connect existing equipment to Ethernet, and no program change is needed. This simple system configuration only requires retrofitting the MELSEC iQ-F series and connecting it to the existing equipment.

▶ The MELSEC iQ-F series is an all-in-one PLC*2 and thus, by purchasing only one CPU module, it could be connected to PLCs manufactured by other companies. The cost was affordable, and the introduction was easy.

*1: FX5UJ CPU modules are connectable to the built-in Ethernet port of the MELSEC iQ-F series and SLMP-compatible devices only. (Other types of communication to be supported in the future.)

*2: A PLC with a power supply, a CPU and an I/O module integrated together.

There is no doubt about choosing the MELSEC iQ-F series

It supports a wide range of networks.

▎ Complete line-up

The MELSEC iQ-F series supports various general purpose/industrial networks. Compared with PLCs of the same class, it supports the most networks and can be configured according to your equipment.

List of supported networks

Module		Compatible networks	FX5U/FX5UC CPU module		FX5UJ CPU module		Remarks
			Supported	Connectable stations/modules	Supported	Connectable stations/modules	
CPU module		Simple CPU communication	✓	16 modules	✓*1	8 modules	
		CC-Link IE Field Network Basic	✓	16 stations	✓	8 stations	Master only
		General-purpose Ethernet	✓	Up to 8 stations in total	✓	Up to 8 stations in total	★2, ★4
		MODBUS/TCP	✓		✓		★4
		MODBUS/RTU	✓	32 stations	✓	32 stations	Master/Slave
FX5 extension module	FX5-CCLGN-MS	CC-Link IE TSN	✓	60 stations	★5		Master/Slave
	FX5-CCLIEF	CC-Link IE Field Network	✓	—	✓	—	Slave only
	FX5-CCL-MS	CC-Link V2	✓	28 stations	✓	14 stations	Master/Slave
	FX5-ENET	Simple CPU communication	✓	32 modules	✓	32 modules	★6
		CC-Link IE Field Network Basic	✓	32 stations	✓	32 stations	Master only
		General-purpose Ethernet	✓	32 stations	✓	32 stations	★3
		BACnet	✓	—	✓	—	B-ASC profile compatible
	FX5-ENET/IP	Simple CPU communication	✓	32 modules	✓	32 modules	★6
		EtherNet/IP	✓	32 stations	✓	32 stations	Scanner
		General-purpose Ethernet	✓	32 stations	✓	32 stations	★3
		BACnet	✓	—	✓	—	B-ASC profile compatible
	FX5-DP-M	PROFIBUS-DP	✓	64 stations	✓	64 stations	Master only
	FX5-ASL-M	AnyWireASLINK	✓	128 stations	✓	128 stations	Master only
	FX5-OPC	OPC UA	✓	4 (Concurrent sessions)	★5		Server only

★1: FX5UJ CPU modules are connectable to the built-in Ethernet port of the MELSEC iQ-F series and SLMP-compatible devices only. (Other types of communication to be supported in the future.)
★2: Protocol type: MELSOFT connection, socket communication, communication protocol support, SLMP server
★3: Protocol type: MELSOFT connection, socket communication, SLMP server
★4: FX5UJ CPU module is currently only connectable to the slave stations. It will be connectable to the master station in the future.
★5: Those will be supported in the future.
★6: FX5-ENET and FX5-ENET/IP are connectable to the built-in Ethernet port of the MELSEC iQ-F series, Ethernet module of the MELSEC iQ-F series, and MODBUS/TCP-compatible devices only. (Other types of communication to be supported in the future.)

▎ Featured Product

The MELSEC iQ-F series' CC-Link IE TSN master/local module (FX5-CCLGN-MS) can be connected to up to **60 stations** and supports medium-scale systems. Unlike the conventional networks, TCP/IP can also co-exist on the same network, allowing easy configuration.
Furthermore, it realizes high-speed communication using the TSN technology (minimum periodic synchronization interval = 250 µs) and real time capability.
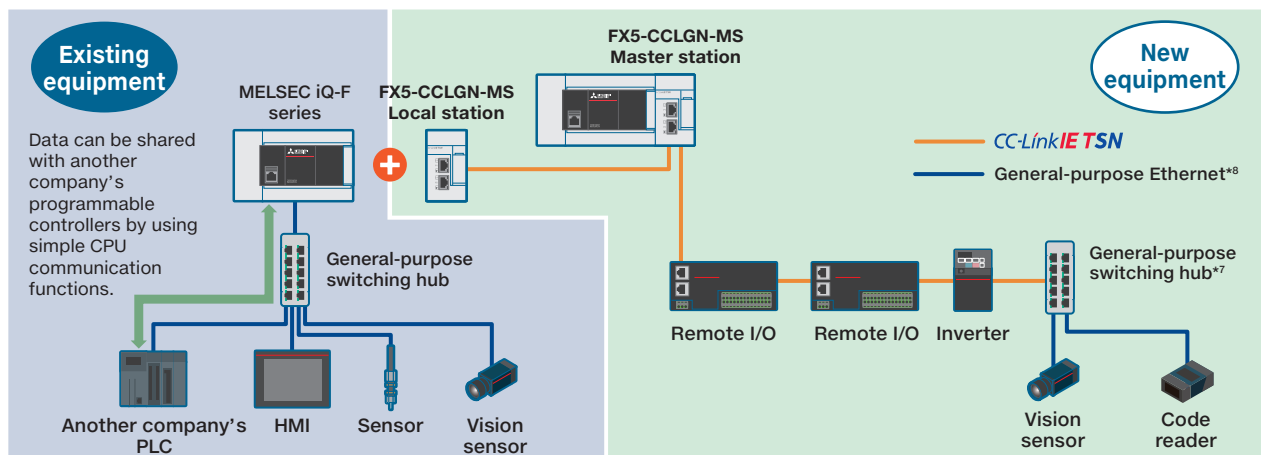
★7: Use a general-purpose switching hub supporting 1 Gbps communication speed.
★8: SLMP-compatible device, MELSOFT product

2 To easily set and operate your actuators

| On-site issues | • Multiple actuators are used in the system, but the program for operation is complicated.
• Because the program needs to be changed, it takes time and effort to change the system's configuration. |

[Before introduction]
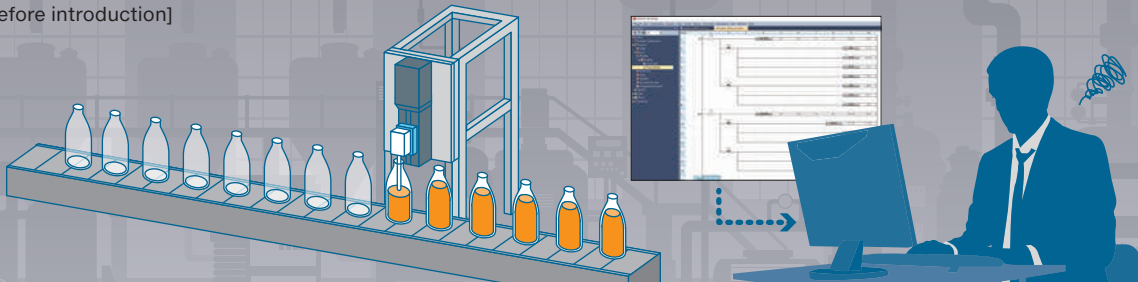
MELSEC iQ-F series solves your problems

Predefined Protocol Support Tool Function FX5U FX5UC

Quick Start

❚ **The predefined protocol support tool for positioning can easily configure positioning settings!**
❚ **A dedicated FB* is provided and no complicated program is required!**

★: FB = Function Block

[After introduction]

The MELSEC iQ-F series provides **predefined protocol support FBs for positioning (seven types in total)**. Using these FBs can ease the programming work.
Furthermore, **the predefined protocol support tool for positioning** enables you to easily change the parameter settings of your electric actuators. The predefined protocol support tool for positioning also enables you to conduct test operations and helps you when starting up and debugging your system.

Predefined Protocol Support Tool For Positioning

Predefined Protocol Support FB

FB

Serial communication

Electric actuator

Controller
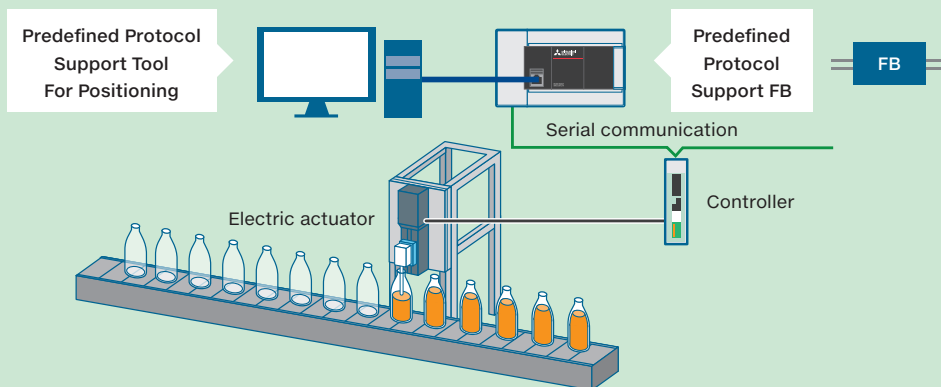
| Benefits |

▶ **Predefined protocol support FBs for positioning were used, and the programming man-hours were reduced.**
▶ **The predefined protocol support tool for positioning enabled easy inputting of an electric actuator's parameters and test operations. Thus, it is useful for starting up and debugging the system.**

More details!

MELSEC iQ-F series
Predefined Protocol Support Tool Function

Predefined Protocol Support Tool For Positioning

7 types in total
FB

The MELSEC iQ-R/iQ-F series can excellently cooperate with various types of electric actuators. The predefined protocol support tool for positioning, which is used to set parameters, and dedicated FBs, which can be used for programming, are provided.
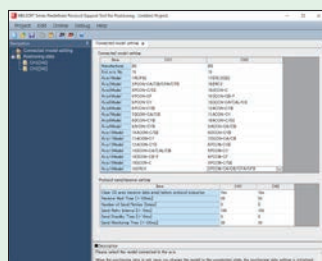
▌Predefined Protocol Support Tool For Positioning

If positioning control data in an electric actuator are connected via serial communication, it is possible to configure them without being aware of their communication protocol.
In addition, the positioning data test function allows an earlier start up of the system.
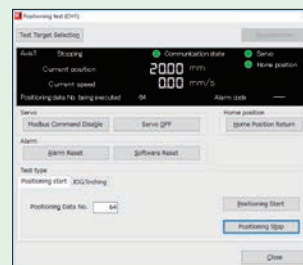
GX Works3 > Tool > Module Tool List
(1) Setting screen

Parameter setting

64 data/axis

Up to 32 axes (2 ch)

Predefined Protocol Support Tool For Positioning > Debug
(2) Positioning test screen

This positioning test is a function to adjust an electric actuator's positioning operation while monitoring its operation.

∗Note: Conduct a positioning test while the FX5U/FX5UC CPU module and an actuator to be tested are connected to each other.

▌Predefined Protocol Support FB

The positioning data are set by the predefined protocol support tool for positioning can be controlled by a program.

Predefined Protocol Support FB For Positioning List (for IAI)

FB name	FB type
M+IAIStartHomePositioning_F	Home Position Return
M+IAIJogInching_F	JOG/Inching Operation
M+IAIReadPositioningTable_F	Position Table Read
M+IAISetPositioningTable_F	Position Table Setting
M+IAIStartPositioning_F	Positioning Operation
M+IAIMonitoring_F	Operation Monitor
M+IAIServoContorol_F	Servo ON/OFF
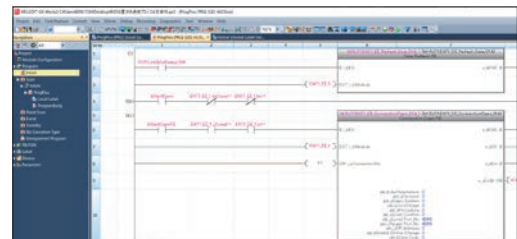
Specifications supporting predefined protocol support functions for positioning

Item	Description
Communication module	Built-in RS-485 ports, expansion boards (FX5-232-BD*, FX5-485-BD), expansion adapters (FX5-232ADP*, FX5-485ADP)
Maximum number of axes/ch	16 axes/ch　Up to 2 channels can be used.
Positioning data	64 data/axis (Acceleration/deceleration values can be set individually.)
Positioning guidance	Present (Explanations, ranges, etc. for individual parameters are guidance displayed.)
Connectable devices	- IAI Corporation 　Supported devices: PCON/ACON/SCON/DCON/ERC2/ERC3 series and RCP6S - ORIENTAL MOTOR Co., Ltd. 　Supported devices: AR/AZ/RKII series - SMC Corporation 　Supported devices: LECP6/LECA6

∗: Transformation from RS-232 to RS-485 is required. Recommended transformation devices are RCB-TU-SIO-A and RCB-TU-SIO-B manufactured by IAI Corporation.

3 To shorten process changeover time

| On-site issues | • Changing over the process for high-mix low-volume production takes time.
• Having to retrieve and deliver the SD memory cards containing production instruction leads to time loss. |

[Before introduction]

Factory

SD Card

I wish I didn't have to keep going back and forth to get the data.

SD Card

Office

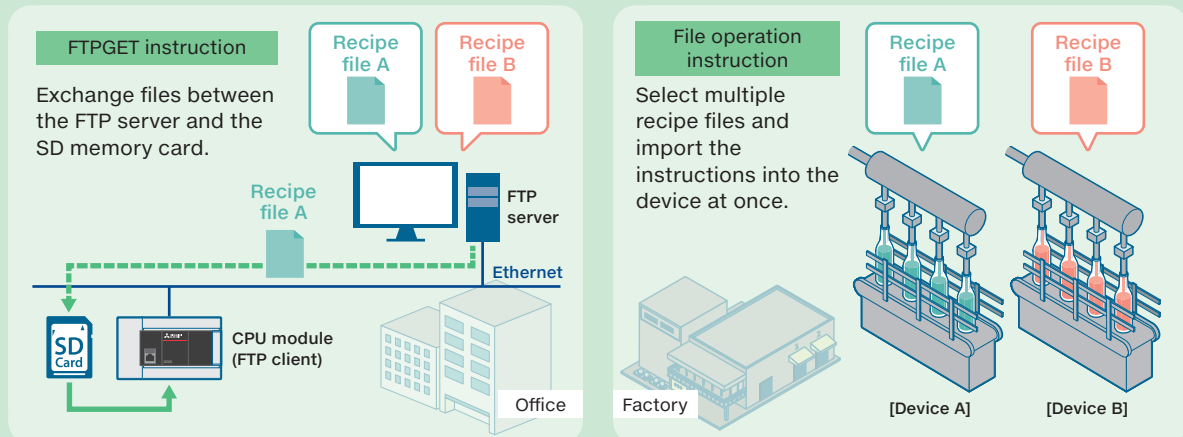**MELSEC iQ-F series solves your problems**

FTPGET instruction × File operation instruction FX5U FX5UC

Quick Start

▮ The automatic recipe data changeover function shortens process changeover time.
▮ Easy remote storage of the recipe files from anywhere.

[After introduction]

The MELSEC iQ-F series come with the recipe file changeover function and the file-edit function to help reduce process changeover time and achieve greater efficiency.
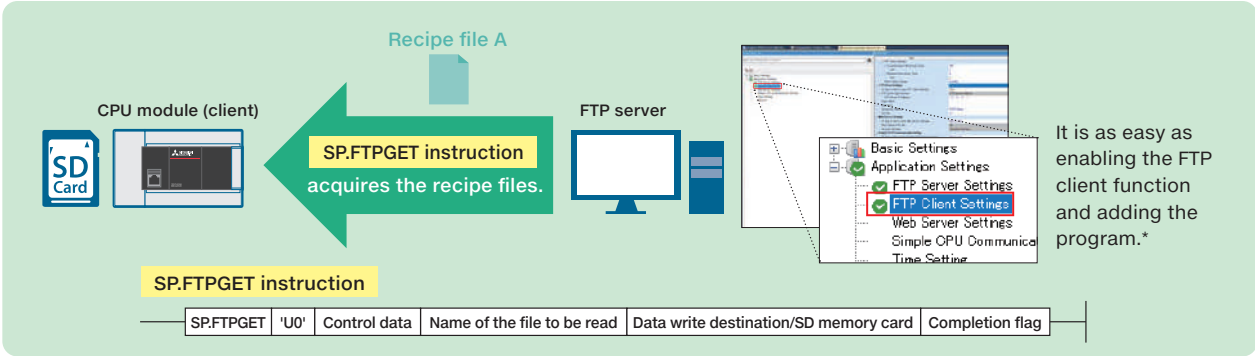
FTPGET instruction

Exchange files between the FTP server and the SD memory card.

Recipe file A   Recipe file B

Recipe file A

FTP server

Ethernet

SD Card

CPU module (FTP client)

Office

File operation instruction

Select multiple recipe files and import the instructions into the device at once.

Recipe file A   Recipe file B

Factory   [Device A]   [Device B]

Benefits

▶ Shorter process changeover time and improved cycle time mean greater daily production volume.
▶ The automatic recipe data changeover function eliminates human errors in importing the recipe data.
▶ Remote PC file retrieval via Ethernet eliminates the need to physically replace the SD memory card.

Advanced strength of the MELSEC iQ-F series

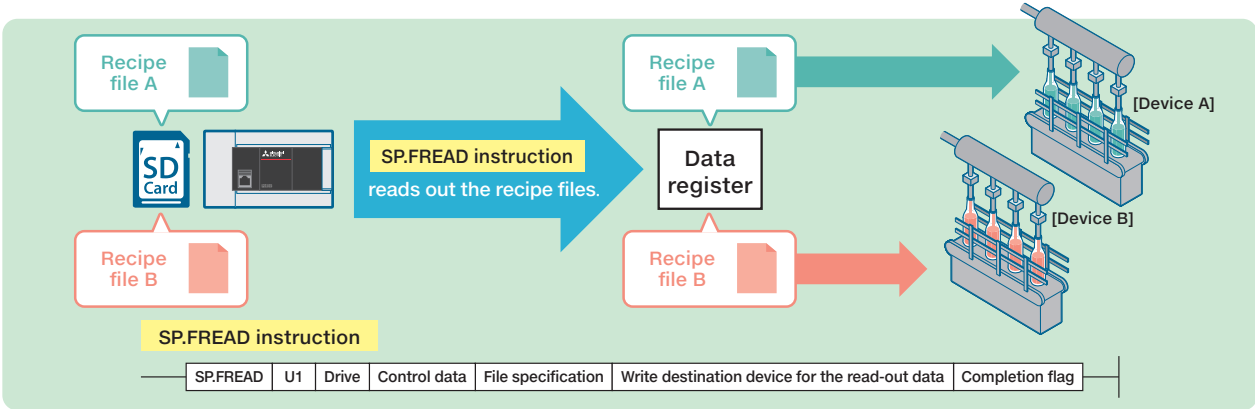# FTPGET instruction × File operation instruction

▌ FTPGET instruction

An FTPGET instruction is an instruction to read out the files on the FTP server to be written to the programmable controller.
Select the recipe files on the FTP server from the program, and send them to the SD memory card on the programmable controller.

Recipe file A

CPU module (client)

SP.FTPGET instruction acquires the recipe files.

FTP server

It is as easy as enabling the FTP client function and adding the program.*

Basic Settings
Application Settings
FTP Server Settings
FTP Client Settings
Web Server Settings
Simple OPU Communica
Time Setting

SP.FTPGET instruction

| SP.FTPGET | 'U0' | Control data | Name of the file to be read | Data write destination/SD memory card | Completion flag |

▌ File operation instruction Data read (SP.FREAD) from the specified file

An SP.FREAD instruction is an instruction to read the device data from the files on the SD memory card.
The files acquired from the FTP server using the SP.FTPGET instruction is read with the file operation instruction.

Recipe file A

SP.FREAD instruction reads out the recipe files.

Recipe file A

Data register

[Device A]

Recipe file B

Recipe file B

[Device B]

SP.FREAD instruction

| SP.FREAD | U1 | Drive | Control data | File specification | Write destination device for the read-out data | Completion flag |

Instructions list

| Instruction name	Function and usage example
SP.FREAD	This instruction reads data from the specified file (BIN/CSV format) on an SD memory card. Usage example: Store the data on the SD memory card that was acquired with FTPGET instruction to the device in the CPU module.
SP.FWRITE	This instruction writes data to the specified file (BIN/CSV format) on an SD memory card. Usage example: Store data device values in place of data logging function by increasing the number of setting numbers and points.
SP.FDELETE	This instruction deletes the specified file or folder on the SD memory card. Usage example: Delete unnecessary data to create more space in the SD memory card.
SP.FCOPY	This instruction copies the specified file or folder on the SD memory card. Usage example: Create backup data.
SP.FMOVE	This instruction moves the specified file or folder on the SD memory card. Usage example: Organize data.
SP.FRENAME	This instruction renames the specified file or folder on the SD memory card. Usage example: Organize the recipe data in categorized folders.
SP.FSTATUS	This instruction acquires the status of the specified file or folder on the SD memory card. - File attribute (read-only, hidden file, etc.) - File size - Last modified date/time Usage example: Check the file size to decide which files to delete.

✷: Requires the communication settings to be made for the FTP client/server.

4 To collect as much equipment logs as needed

On-site issues	• It is troublesome to record serial numbers and measurements regularly. However, such data must be recorded in case of trouble. • Although equipment logs are recorded, there are too many data and it is difficult to judge where to start.

[Before introduction]

It's very hard to keep records manually…
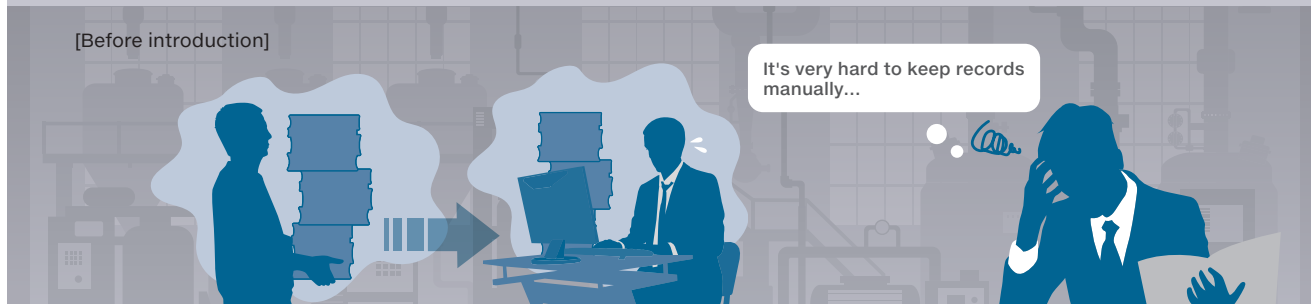
MELSEC iQ-F series solves your problems

Data logging function FX5U FX5UC FX5UJ

Quick Start

▌ **It enables collecting logged data easily with no program required!**
▌ **The logged data are output in CSV format* which can be managed by Microsoft® Excel®!**

[After introduction]

No program is required, and logging data can be acquired only by setting parameters. Therefore, products' ID numbers read by a 2D code reader can be easily collected.
Also, logged data can be collected automatically, and they can be managed by Microsoft® Excel®, etc. if they are stored in the CSV file format.

Reduced man-hours

SD Card

Logging file (CSV file)
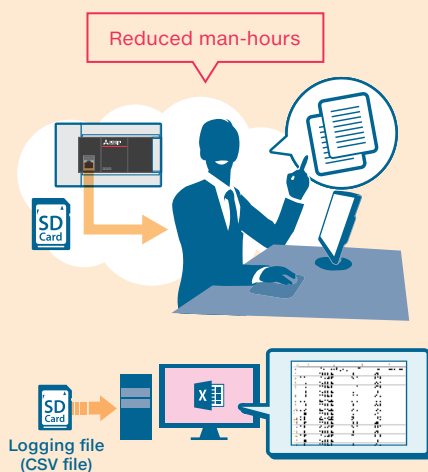
Logging Configuration Tool

Simply select "CSV file" in the file selection.

By using trigger logging, it is possible to collect logging data while narrowing them down to abnormal ones which exceed a threshold value set in advance!

<Example output in CSV file format>
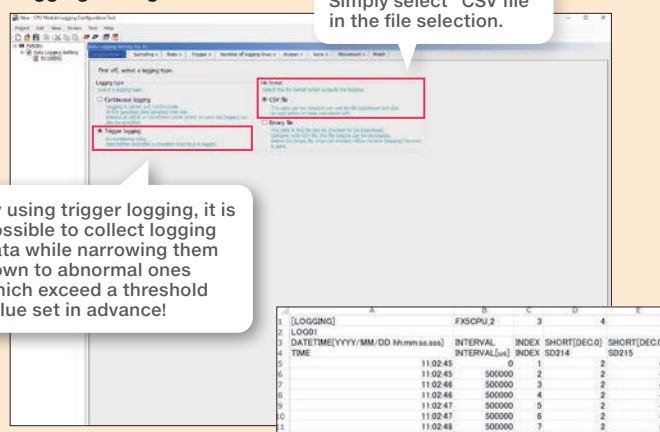
▌ Benefits

▶ **When a trouble occurred, data collected during production could be checked and therefore, time to investigate its cause could be reduced.**

▶ **Data can be stored in the CSV format and therefore, they can be easily managed by Microsoft® Excel®.**
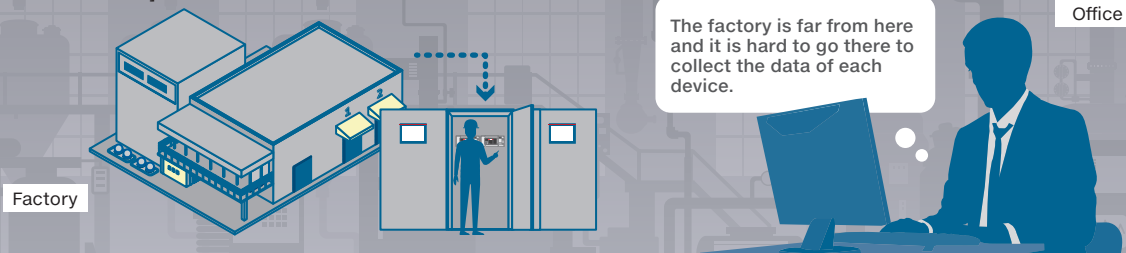
✶: The FX5UJ CPU module is planned to be supported in the future.

5 To collect logs from remote sites together

On-site issues

- The logs of devices are being collected, but it is necessary to visit the site at a remote location.
- It takes time and effort to visit the installation places of multiple devices and collect their logged data.

[Before introduction]

The factory is far from here and it is hard to go there to collect the data of each device.

Office

Factory

MELSEC iQ-F series solves your problems

Quick Start

FTP server function/FTP client function*² | FX5U | FX5UC | FX5UJ

- Enables the data of devices located at remote sites to be transferred, allowing easy collection.
- The logged data can be stored on a PC automatically!

[After introduction]

CASE 1: When it is needed to collect data together at an arbitrary timing.

FTP server function By enabling the FTP server function using GX Works3, it becomes possible to read and write files from a PC in your office.

Server side
SD Card Logging file (CSV file)
Client side
File reading/writing
Ethernet
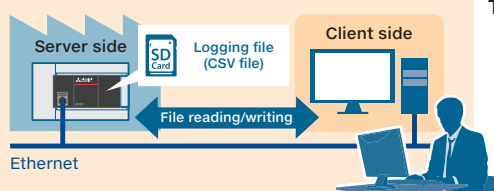
To activate FTP, use a command prompt*¹ on your PC's screen.

❶ FTP start (FTP [Enter])
❷ Connect with FTP server (open CPU module IP address [Enter])
❸ Specify login name (login name [Enter])
❹ Specify password (password [Enter])

CASE 2: When it is needed to automatically transfer data to your PC

FTP client function*² By enabling the FTP client function by GX Works3 and adding a program, it becomes possible to automatically transfer data to a specified location.

Client side
SD Card Logging file (CSV file)
Server side
File transfer
Ethernet
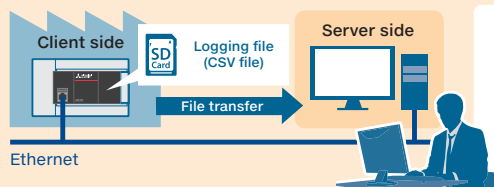
[Setting of GX Works3]
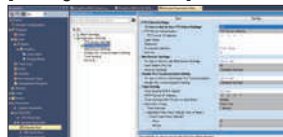
FTPPUT instruction will enable automatic transfer at any time.

[Adding program]   FTPPUT instruction

FTPPUT (FTP client file transmission) instruction

| SP.FTPPUT | (U) | (s1) | (s2) | (s3) | (d) |

Benefits

▶ It became possible to easily collect and check the logging files of devices abroad while staying in my country.

▶ It became possible to easily collect and transfer data automatically without visiting the site to collect them regularly. It will also be possible to not forget about collecting such data.

*1: A tool to use a statement called a command to perform Windows® operations and settings.
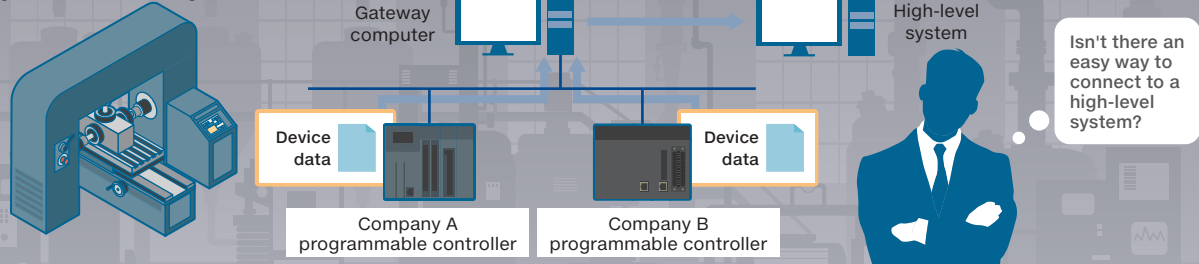*2: The FX5UJ CPU module is planned to be supported in the future.

6 To enable seamless data exchange between the high-level system and the connected devices

On-site issues

- Separate control of stand-alone equipment adds extra work.
- The use of multiple programmable controllers by different manufacturers stands in the way of achieving centralized control.

[Before introduction]

Gateway computer

High-level system

Device data

Company A programmable controller

Device data

Company B programmable controller

Isn't there an easy way to connect to a high-level system?

MELSEC iQ-F series solves your problems
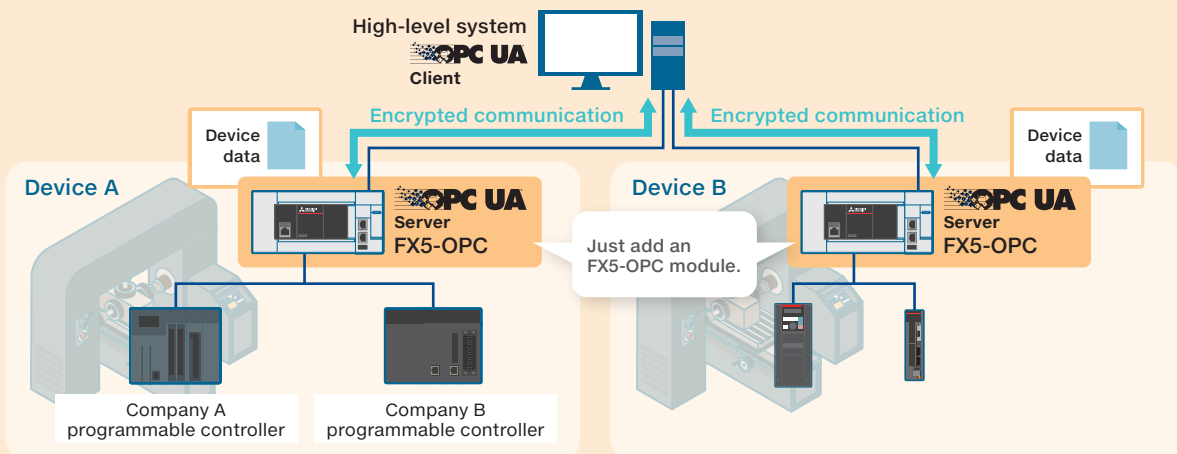
Quick Start

MELSEC iQ-F FX5-OPC   FX5U   FX5UC

- **FX5-OPC allows for data integration between stand-alone equipment and high-level systems.**
- **No need for an integrated programmable controller or an OPC UA-compatible gateway computer. Just connect to your familiar programmable controller.**

[After introduction]

Access the data of the FX5U(C) CPU module via the FX5-OPC, which works as a server. Encrypted communication capability of FX5-OPC protects your sensitive information, such as machining information, from unauthorized access.

High-level system
OPC UA Client

Encrypted communication   Encrypted communication

Device data

Device A

OPC UA Server
FX5-OPC

Just add an FX5-OPC module.

Device B

OPC UA Server
FX5-OPC

Device data

Company A programmable controller

Company B programmable controller

Benefits

▶ **Centralized control of individual device data and simplified data management**
▶ **A simple addition of an FX5-OPC to the existing equipment enables a collective acquisition of all equipment data.**
▶ **Secure data exchange with a tight security.**

More details!

Advanced strength of the MELSEC iQ-F series

OPC UA

▌ What is OPC UA?

OPC UA is a platform-independent communications standard developed by the OPC foundation, USA. It enables data exchange between vendor and OS neutral products, and offers secure and reliable data communications between manufacturing levels and higher-level IT systems.

▌ FX5-OPC product specifications

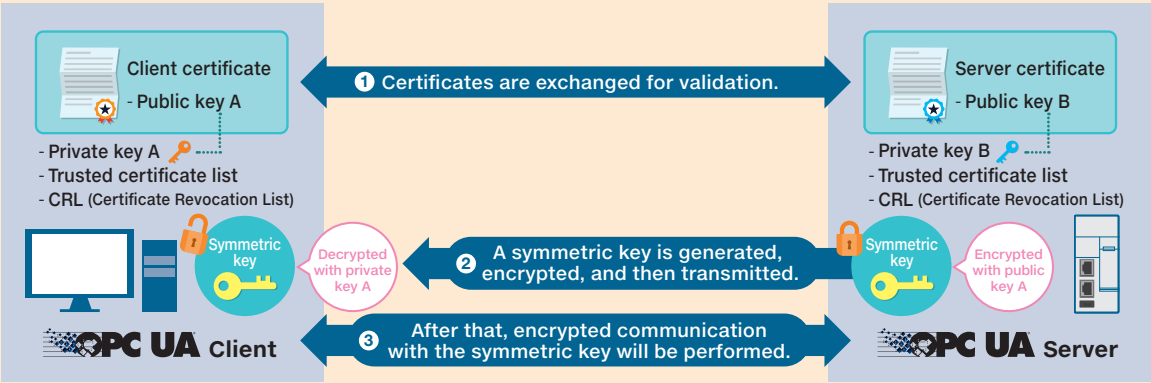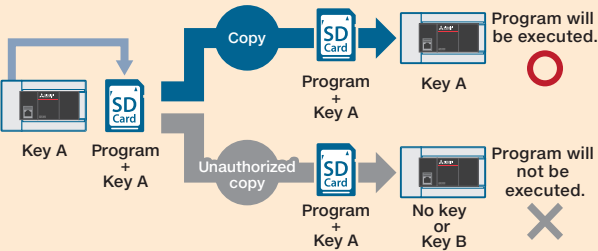OPC UA server modules are also available in the MELSEC iQ-R series to suit your needs.

	FX5-OPC	RD81OPC96 (iQ-R OPC UA server module)
Data transmission speed	100 Mbps/10 Mbps	100 Mbps/10 Mbps
OPC UA function	Server function	Server function
Maximum number of parallel sessions	4	15
Maximum number of subscriptions[1]	8	150
Maximum number of monitored items[2]	4000	12000
Engineering tool	- OPC UA Module Configuration Tool - GX Works3	- OPC UA Module Configurator-R - GX Works3

+ONE

Enhanced security

The MELSEC iQ-F series feature a password protection and an authentication function to protect your sensitive data from an everincreasing threat of cyber attacks.
Certificates are exchanged between FX5-OPC and the connected device to block unauthorized access and ensure secure communication with the high-level device.

Security key authentication example

Copy
SD Card
Program + Key A
Key A
Program will be executed.

Key A   Program + Key A

Unauthorized copy
SD Card
Program + Key A
No key or Key B
Program will not be executed.

Client certificate
- Public key A
- Private key A
- Trusted certificate list
- CRL (Certificate Revocation List)

❶ Certificates are exchanged for validation.

Server certificate
- Public key B
- Private key B
- Trusted certificate list
- CRL (Certificate Revocation List)

Symmetric key   Decrypted with private key A

❷ A symmetric key is generated, encrypted, and then transmitted.

Symmetric key   Encrypted with public key A

OPC UA Client

❸ After that, encrypted communication with the symmetric key will be performed.

OPC UA Server

*1: Number of subscriptions = The number of monitored item control groups
*2: Number of monitored items = The number of devices connected to the CPU module that can be acquired via OPC.

7 To remotely monitor your equipment's states via mobile terminals

On-site issues

- It is necessary to visit the remote site just to check the state of a device/equipment.
- To check that device's state, it is necessary to activate the engineering tool.

[Before introduction]
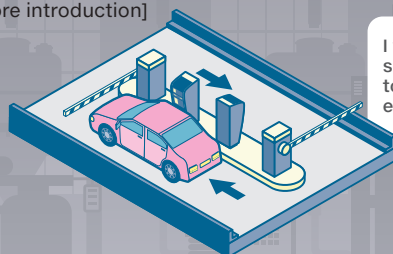
I wish I could use my smartphone or tablet to freely check the equipment...

MELSEC iQ-F series soles your problems
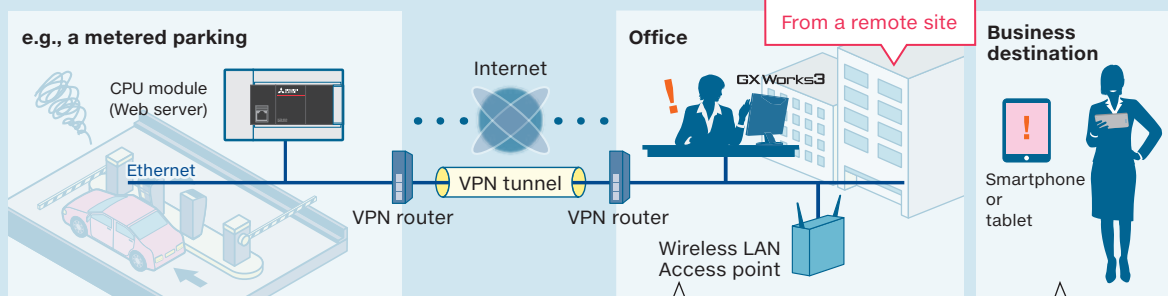
Web server function   FX5U   FX5UC   FX5UJ
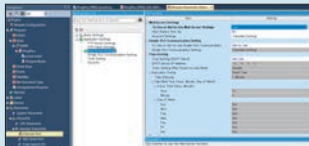
Quick Start

▮ **No program is required! Simple diagnosis can be made just by accessing the PLC!**
▮ **The PLC can be accessed with a smartphone or tablet!**
▮ **An original Web page can be designed by the user!**

[After introduction]   **You can watch the operation state of a device from a remote site!**

e.g., a metered parking

CPU module (Web server)

Ethernet

Office

Internet

From a remote site

GX Works3

VPN tunnel

VPN router   VPN router

Wireless LAN Access point

Business destination

Smartphone or tablet

GX Works3 setting screen

[Module Parameter] > [Ethernet Port] > Web Server Settings

System Web page

If you use your PC's Web browser to access the system web page, you can check error situations, etc.

User Web page

"User Web pages" unique for each user can also be created. If a dedicated tool is used, drawing will also become easy.
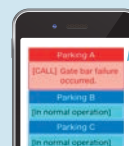
User Web page drawing tool

Benefits

▶ **It was possible to check the situation of the site by freely using the smartphone or tablet without any need of a PC or an engineering tool.**
▶ **Before visiting the site, a simple diagnosis helped the preparation fully and therefore, I was able to perform my work efficiently.**
▶ **By adding device maintenance services and options, it was possible to provide added values.**
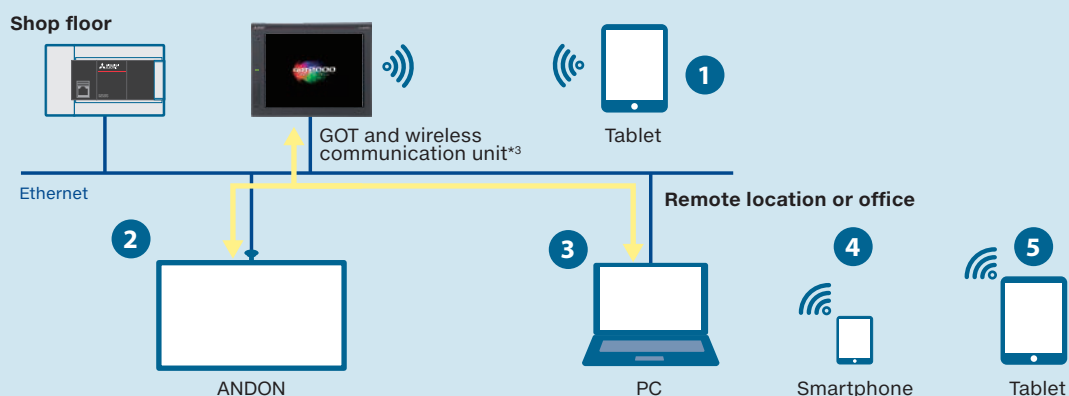
+ONE

GOT Mobile

GOT Web-based Remote Solutions

On site

The GOT Mobile is a function which enables the user to monitor and operate equipment with no dedicated tool from tablets and other mobile terminals via an on-site GOT.
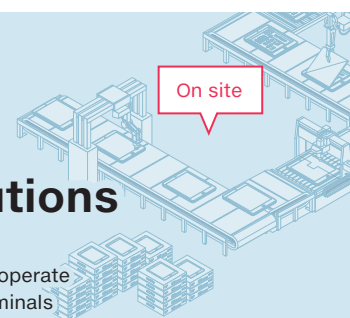
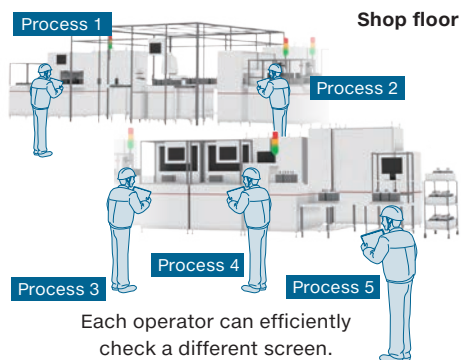## ▌ Five information devices can access a GOT at the same time![*1]

Each information device can display and operate a different screen.[*2]

Shop floor

GOT and wireless communication unit[*3]

Tablet ①

Ethernet

② ANDON

Remote location or office

③ PC

④ Smartphone

⑤ Tablet

7

| Improve setup procedure	Improve productivity
Monitor production by multiple operators	**Monitor production from outside of the clean room**
When the equipment is large, up to five stations can efficiently work at the same time to check and make settings.	The status of equipment can be monitored using tablets from outside of the clean room.

Shop floor

Process 1
Process 2
Process 3
Process 4
Process 5

Each operator can efficiently check a different screen.

Shop floor
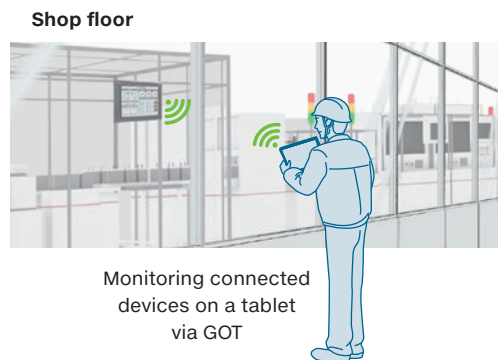
Monitoring connected devices on a tablet via GOT

★1: Up to five clients can connect to a GOT at the same time.
★2: Simultaneous operations can be prevented on the same network. For details, please see the relevant product manual.
★3: For the countries where the unit can be used and other details, please refer to the Graphic Operation Terminal
     GOT2000 Series/GOT SIMPLE Series Catalog (L(NA)08270ENG) or the relevant product manual.

GOT Web-based
Remote Solutions
L(NA)08399ENG

8 To directly monitor operation states on the site

e-F@ctory
Connect everything

On-site issues	• Interested in introducing IoT to equipment, but unsure of the procedures. • Data are collected from a production site, but unsure where improvements can be made. • Full update of the system to implement visualization is not desired. Such as replacing all PLCs with new ones.

[Before introduction]
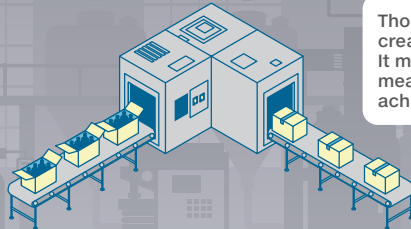
Though we have data, we must create programs for visualization. It may be expensive, and it is meaningless if no improvement is achieved after the introduction.

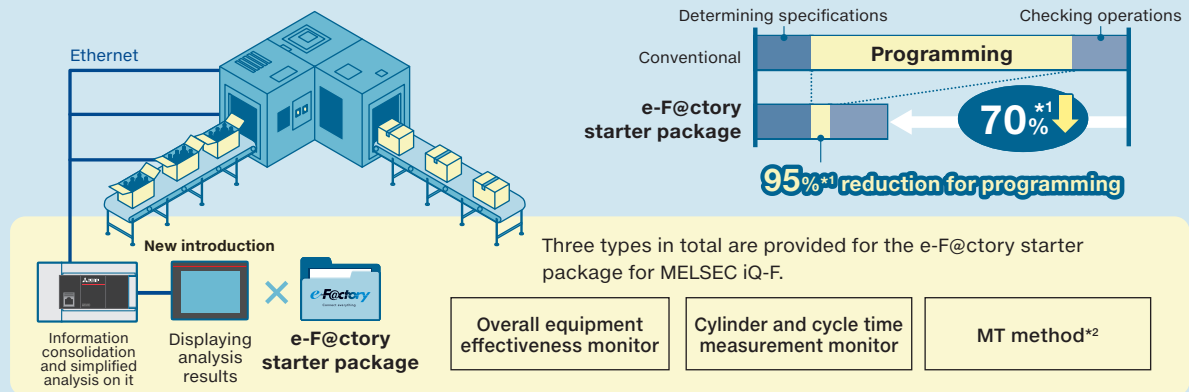## MELSEC iQ-F series solves your problems

e-F@ctory Starter Package   FX5U   FX5UC

Quick Start

▌ **Areas that need improvement will become obvious! Equipment visualization can be realized from its operation states!**
▌ **Only by adding a single PLC to existing equipment can realize visualization easily!**
▌ **Also, there is no need to worry about programming! Sample programs are provided!**

[After introduction] By introducing the e-F@ctory starter package, development costs can be reduced greatly, and the visualization of equipment can be realized easily.

Ethernet

Determining specifications   Checking operations

Conventional   **Programming**

e-F@ctory starter package   **70%**[*1]

95%[*1] **reduction for programming**

New introduction

Information consolidation and simplified analysis on it

Displaying analysis results

× e-F@ctory starter package

Three types in total are provided for the e-F@ctory starter package for MELSEC iQ-F.

Overall equipment effectiveness monitor	Cylinder and cycle time measurement monitor	MT method[*2]

What is the e-F@ctory starter package...
The e-F@ctory starter package is a package of sample projects for analyzing equipment information collected in the programmable controller and displaying analyzed results on the GOT (HMI). Designing complex analysis algorithms and graphs is unnecessary, constructing the equipment operation monitoring system **easily** and **quickly**.

Benefits

▶ **The visualization of the equipment and devices has been realized, and helped to improve the production site.**
▶ **Only a single MELSEC iQ-F series CPU module with built-in serial and Ethernet ports allowed the visualization of the existing equipment.**
▶ **The introduction of the e-F@ctory starter package was carried out using sample programs/screens and reduced man-hours.**

+ONE

The MELSEC iQ-R series delivers more abundant features!

Mitsubishi Electric
e-F@ctory starter package
E001ENG

★1: When the e-F@ctory starter package's functions are used as they are (e.g., the functions satisfy the user's specification).
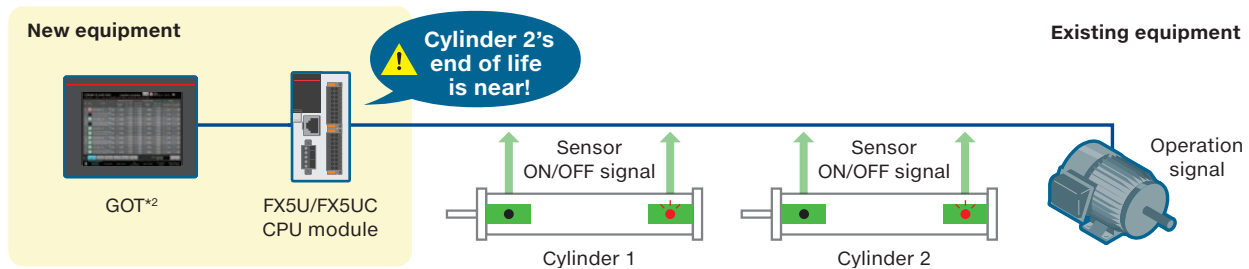★2: Abbreviation of the Mahalanobis-Taguchi method

Advanced strength of the MELSEC iQ-F series

e-F@ctory starter package

e-F@ctory Connect everything

▌ Cylinder & cycle time*[1] measurement monitor `FX5U` `FX5UC`

The operating time of a cylinder and the cycle time of the equipment can be measured, and it is possible to visualize if the measurements are above their thresholds.
The cumulative operation count and time can be also measured, and the mechanical life can be monitored.
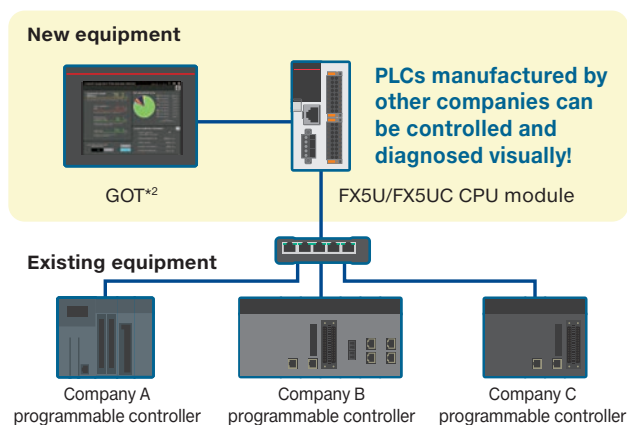

New equipment

Cylinder 2's end of life is near!

GOT*[2]　　FX5U/FX5UC CPU module

Sensor ON/OFF signal　　Sensor ON/OFF signal　　Operation signal

Cylinder 1　　Cylinder 2

Existing equipment

Project specifications

Item	Description
Number of supported cylinders	30
Number of intermediate position sensors	2
Measurement time	Up to 32,767 msec

Item		Required capacity
Number of steps		Approx. 11.1 k steps
Amount used for labels		Approx. 15.4 k words
Amount of latch labels used		Approx. 0.6 k words
Memory area capacity setting	Device (high-speed) area capacity	12 k words
	Device (standard) area capacity	25 k words
	Label area capacity	21 k words
	Latch label area capacity	2 k words

▌ Overall equipment effectiveness monitor `FX5U` `FX5UC`

Any rejection rate, equipment unavailability, etc. can be visualized.

New equipment

PLCs manufactured by other companies can be controlled and diagnosed visually!

GOT*[2]　　FX5U/FX5UC CPU module

Existing equipment

Company A programmable controller　　Company B programmable controller　　Company C programmable controller

Project specifications

| Item	Required capacity
Number of steps	Approx. 0.7 k steps
Amount used for labels	Approx. 1.8 k words
Amount of latch labels used	0.1 k words

Screen overview

No.	Description
1	In cooperation with the production volume counting function, calculates/displays overall equipment efficiency, etc.
2	Shows the graph of equipment operating time and non-operating time (according to non-operating causes).
3	Shows product type data, the production volume of product types currently produced, etc.

*1: Working hours required for a particular process in a production line
*2: GT SoftGOT2000 is also supported.

8

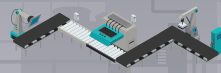# 9 To visualize the whole process   GT SoftGOT 2000

On-site issues

- Different devices are adopted from different manufactures. Therefore, the whole process is not unified and difficult to understand.
- There are multiple lines and it is necessary to visit each site to check their production status.

[Before introduction]
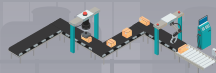
If only there was a way to monitor multiple lines with one PC...

Company A programmable controller

Company B programmable controller

Company C programmable controller

MELSEC iQ-F series × GOT solutions solve your problems

Quick Start

GT SoftGOT2000*1

▌ No special system is required! Just use GT SoftGOT2000 to monitor on-site programmable controllers and the whole process.

▌ There is no need to visit the site, and multiple lines can be monitored together remotely!
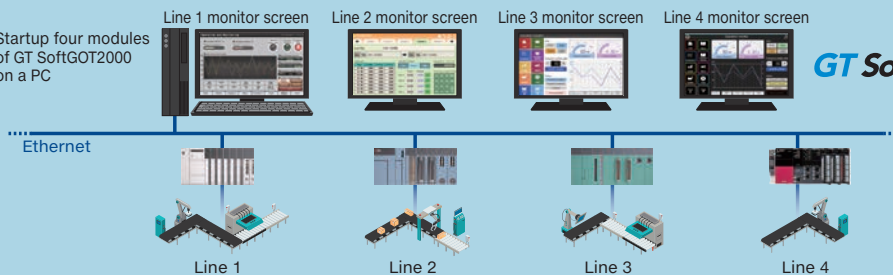
[After introduction] GT SoftGOT2000 will allow you monitor multiple lines together using a single PC.

Multiple monitors display large screens

Startup four modules of GT SoftGOT2000 on a PC

Line 1 monitor screen   Line 2 monitor screen   Line 3 monitor screen   Line 4 monitor screen

GT SoftGOT 2000

Ethernet

Line 1   Line 2   Line 3   Line 4

Since multiple modules of GT SoftGOT2000 can be started on a single PC*2, multiple lines can be monitored collectively. By displaying the screen on multiple monitors, the contents can be viewed in larger screens.

What is the GT SoftGOT2000?

GT SoftGOT2000 is the HMI software that runs on PCs and panel computers. It can be used to monitor and operate the information of industrial devices that are connected to a PC or a panel computer via a network.

GT SoftGOT2000 license key (for USB port)

GT SoftGOT2000 Solutions
L(NA)08606ENG

Benefits

▶ The PC was connected to different devices' PLCs so that the visualization of the whole process was easily realized.

▶ It is possible to monitor devices from the office or other remote locations without visiting the site.

＊1: GT SoftGOT2000 is a software included in GT Works3. A separate license key (GT27-SGTKEY-U) must be installed during use.
＊2: It is recommended to use up to four modules of GT SoftGOT2000 online on a personal computer simultaneously.

+ONE

iQ Monozukuri

Process remote monitoring

▌ iQ Monozukuri easily introduces IoT to the shop floor

### Visualization of operation status improves manufacturing process and productivity

iQ Monozukuri Process Remote Monitoring is an application package to easily introduce IoT technologies to the shop floor, collect and visualize information of multiple devices, and collectively manage the information.

Manufacturing process and productivity of the whole production can be improved by analyzing the data displayed on GT SoftGOT2000. The operation status of the shop floor and the information such as operation logs and alarms can be collected from each device via an on-site GOT.

Features

- Incorporating the package into existing equipment makes system implementation easy
- Collectively manage information that used to be managed individually
- Template screens to analyze the equipment status are included

Displaying collected information in a screen of GT SoftGOT2000

GT SoftGOT 2000   PROCESS REMOTE MONITORING

Ethernet   HUB
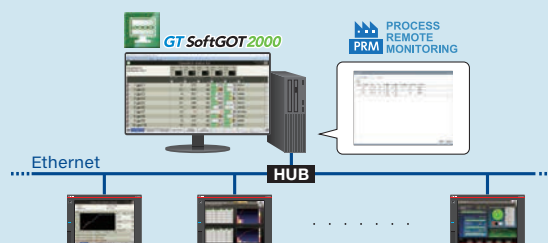
[Collecting information of the shop floor]

Process Remote Monitoring setting tool collects and visualizes information of the shop floor. This tool can be used by selecting GOTs (more than one) that have the information to be collected and setting the information needed (such as devices or resource data).

Without specialized knowledge such as programming, information to be displayed in GT SoftGOT2000 can be easily set.

| Introduction	Operation	Analyzation	Improvement
Easily collect and visualize information of multiple devices on a production line	Managing multiple kinds of equipment on a production line	Easily analyze with a template for analyzation	Extract a problem from the analysis results. Identify the root cause of the problem, and plan and implement countermeasures.

[Examples of template screens for process remote monitoring]
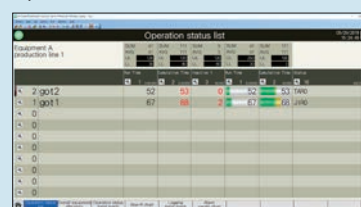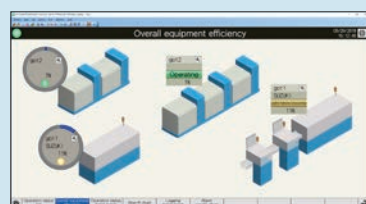
Xbar-R chart
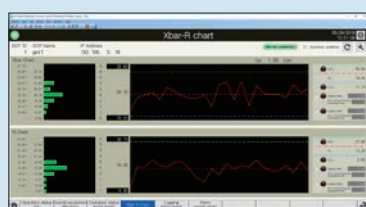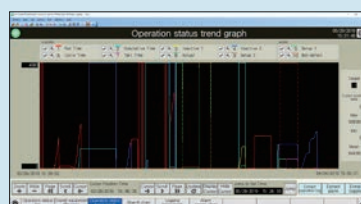

Alarm pareto chart
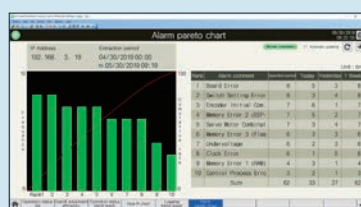
Operation status list

Overall equipment efficiency

Operation status trend graph

FA Application Package
iQ Monozukuri
Process Remote Monitoring
L(NA)08674ENG

9

10 To perform predictive maintenance before any failure

e-F@ctory
Connect everything

On-site issues	• The machine should undergo maintenance before failure, but it is difficult to judge where to begin. • It is expensive to analyze data and introducing predictive maintenance is not easy. • Temperature and current values are individually monitored, but failure and emergency alarms go off even if there is no problem.

[Before introduction]
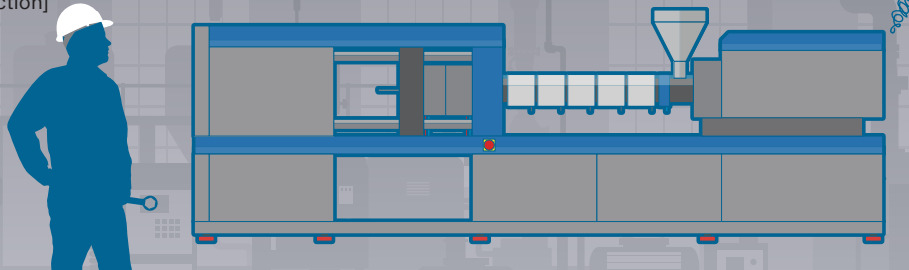
MELSEC iQ-F series solves your problems

Quick Start

e-F@ctory Starter Package FX5U FX5UC

▮ A sample analysis method program using the "MT method" is provided!
▮ You can introduce predictive maintenance using only the MELSEC iQ-F series and GOT!

[After introduction]

The MT method is a statistical technique which can detect "abnormality".
Use the e-F@ctory starter package for MELSEC iQ-F being provided. You can select up to 10 items and data will be collected and analyzed comprehensively.
This will enable you to detect "abnormality" about the equipment and to prevent sudden failure from occurring.
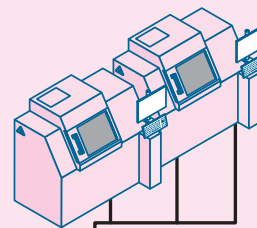
MT method
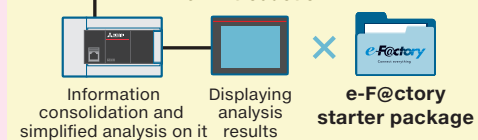(CPU module FX5U-32MR/ES, etc.)

Sampling/logging
(Multi input module FX5-8AD, etc.)

Sensor
(Temperature, flow rate, pressure, current, etc.)

New introduction

Information consolidation and simplified analysis on it

Displaying analysis results

e-F@ctory starter package

Benefits

▶ With the complimentary sample programs and screens, the predictive maintenance could be introduced easily during the initial commissioning.

▶ It was possible to easily select which data would be effective by selecting and testing items such as temperature and current value.

▶ It was possible to use multiple items to conduct a comprehensive analysis, helping to find the cause of an abnormal event.

More details!

Advanced strength of the **MELSEC iQ-F** series
e-F@ctory starter package

e-F@ctory
Connect everything


▍MT method `FX5U` `FX5UC`

[MT method for predicting abnormality]
The MT method is a multivariate analysis technique which utilizes the Mahalanobis distance used in statistical analyses.
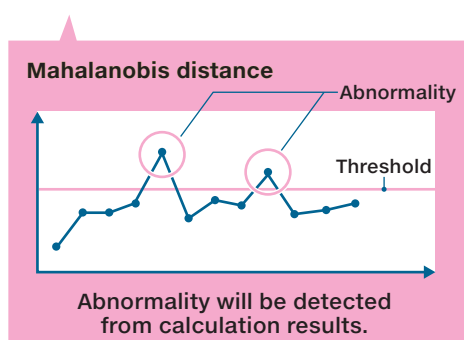This is an optimal technique to predict abnormality.

[What can be done by MT method]
- Multiple items (electric current, voltage, temperature, etc.) can be analyzed, and a single value will be obtained to show how much it deviates from the normal (average) values.
- Bases for the TM method are created from normal data and therefore, even if abnormality occurs for the first time, it can be detected.
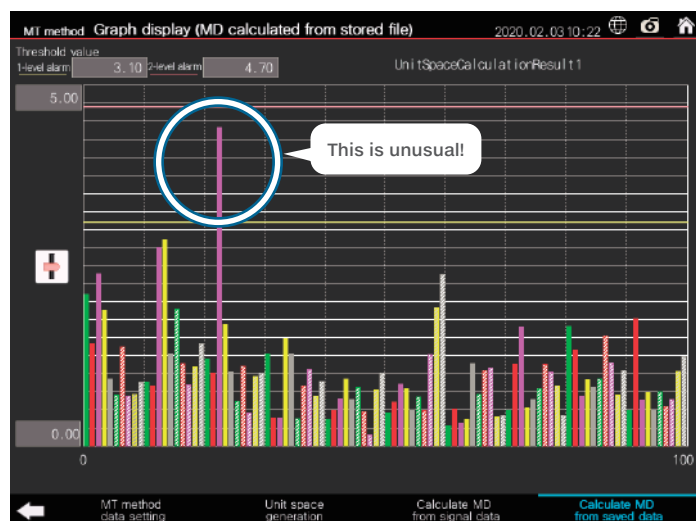
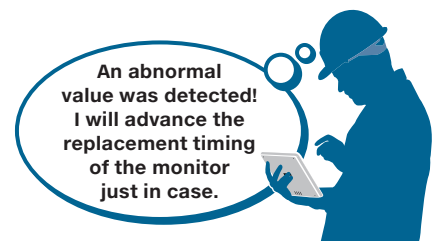### [Screen for calculating MD from signal data]
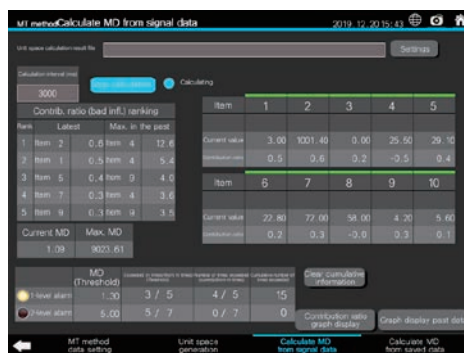
A divergence level from normal data (the Mahalanobis distance) will be calculated.

Mahalanobis distance
Abnormality
Threshold
Abnormality will be detected from calculation results.

[Screen displaying MD graph]

This is unusual!

Calculation results can be displayed in a graph. Defect trend can be visualized.

An abnormal value was detected! I will advance the replacement timing of the monitor just in case.

10

Project specifications

| Item			Description
MT method	Number of items		Up to 10 items
	Number of data samples		Up to 100 points
	Processing speed	Unit space generation	Approx. 1,000 msec
		Mahalanobis distance calculation	Approx. 15 msec

Item	Required capacity
Number of steps	Approx. 50 k steps
Amount of labels used	Approx. 12 k words
Amount of file registers used	Approx. 22 k words

To reduce debugging man-hours

On-site issues	• Devices and settings need to be changed during debugging of the program. However, it is hard to determine which part of the program will be affected due to the change. • Analyzing a complicated program is difficult and it takes time and effort even for minor program modification.

[Before introduction]
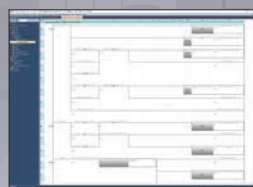
> I want to correct an errored portion, but I'm not sure if other program portions will be affected if I do so...

**MELSEC iQ-F series × GX Works3** solves your problems

Quick Start

Data flow analysis function FX5U FX5UC FX5UJ

❚ **It is possible to quickly identify the part of the program which is causing the problem!**
❚ **The relationship of cause and result becomes more clear.**

[After introduction] **Even for a complicated program, efficient debugging reduces work time!**

It is troublesome to sequentially check programs one by one. The data flow analysis function can graphically display programs that affect the analysis target device/label in the flow chart and facilitates factor analysis at error occurrence.

Devices/labels that affect the analysis target

Analysis target device/label

Devices/labels that are affected by the analysis target
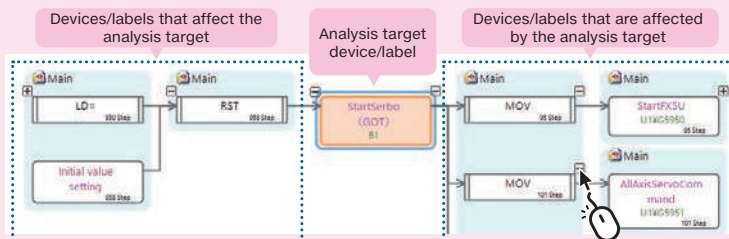
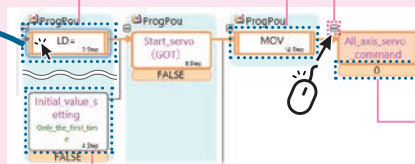> This data flow analysis can be applied not only to the ladder language but also to the ST, FBD and LD languages.

Useful functions

Jump from data flow diagram
If you double click, then you can jump to the program editor.

Double click

Program editor
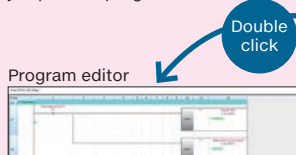
Not only devices/labels but also command names will be displayed.

Unfold/fold a corresponding part.
By only clicking " + / − ", you can track and check program connections.

Monitor values can be displayed.
Monitor values can be displayed on a data flow diagram during monitoring and offline monitoring.

❙ Devices/labels and comments are displayed simultaneously.

Benefits

▶ **Affected areas can be visually detected, and therefore, it becomes easier to identify causes and shortens debugging time.**
▶ **Based on analysis results, only the related areas will be displayed and debugging will become more efficient.**

+ONE

# Memory dump function `FX5U` `FX5UC` `FX5UJ`

From a remote site

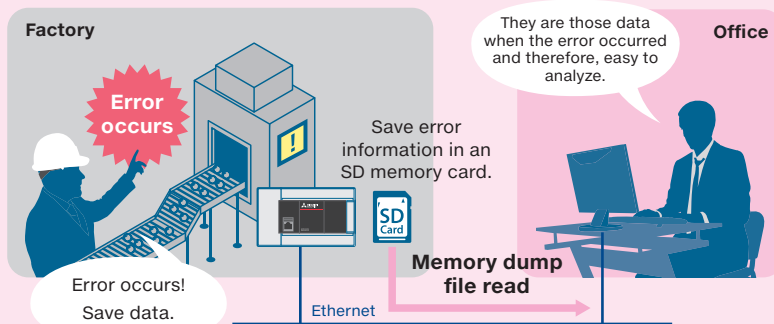## Saving data when a trouble occurs!

It is hard to identify the location where an error occurred after a trouble happened. If the memory dump function is executed when an error occurs to save device values, it will become easier to identify the error's cause(s) and recovery time will be shortened.

In addition, by reading the memory dump file via Ethernet, the data can be checked from the office without visiting the site .

It can be introduced only by setting parameters!
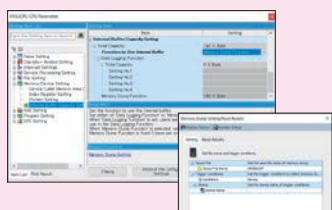
Before using the memory dump function, conduct various settings by GX Works3 and write parameters to your PLC.

Factory

Error occurs

Error occurs! Save data.

Save error information in an SD memory card.

SD Card

Memory dump file read

Ethernet

They are those data when the error occurred and therefore, easy to analyze.

Office

For a quick cause investigation, it is important to collect the data at the timing of error occurrence.

+ONE

On site

Real-time monitoring function `FX5U` `FX5UC` `FX5UJ`

Identify the cause of trouble while monitoring the operation in front of the device!

The operation of a device in question can be visualized if its measured data are displayed in a waveform graph. Changes can be noticed at a glance and speedy investigation can be conducted.

Trouble

GX LogViewer

Status change

Problem cause
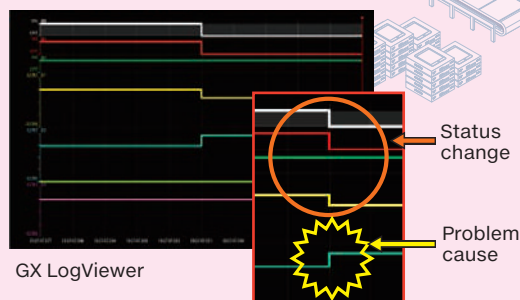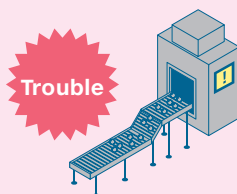
If you use the operation assistance function, you can efficiently investigate the cause.

Cursor jump function
([Graph Operation] > [Cursor Jump])
The cursor can be moved to the specified value, date, and index position in the trend graph.

[Scale the time axis]
([Ctrl] plus mouse wheel rotation)

11

23

12 To analyze the errors faster

On-site issues

- Recurrence of errors after restoration. Difficulty identifying the root cause of the problem.
- Time consuming data analysis to identify the problem cause.

[Before introduction]
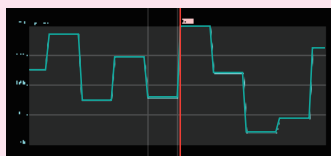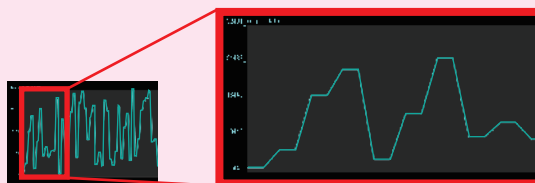
What was actually happening when the error occurred?

Quick Start

Camera recording package FX5U FX5UC FX5UJ

❚ **See the error cause at a glance in the recording.**
❚ **Easily analyze and debug the data with GX VideoViewer available for free.**

[After introduction] **Fix the program while viewing the recorded data about the error.**

GX LogViewer

GX VideoViewer

Status change

Problem cause
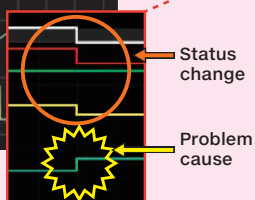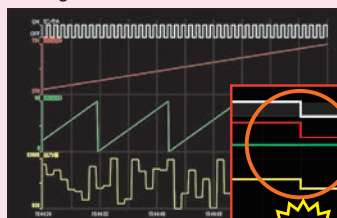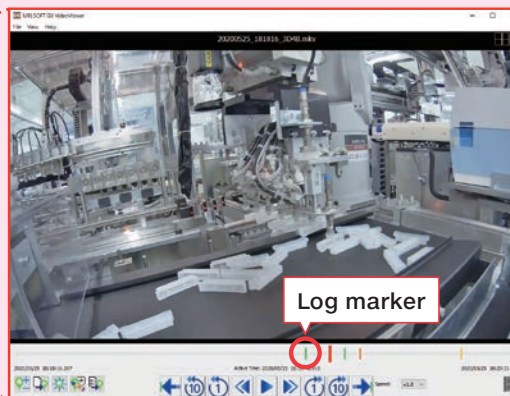
Log marker

Import the log markers to GX LogViewer and GX Works3, and use them in combination with the waveform graph to help analyze the data. Quickly jump to the program responsible for the problem to debug the program efficiently.

Benefits

▶ **Fast program debugging with the combined use of the device data and the video recording allows for shorter recovery time.**

▶ **No need to purchase a number of other devices that add to the cost.**

More details!

Secure maintenance with MELSEC iQ-F series

Camera recording package

▋ Multi-angle analysis

A maximum of eight cameras are connectable to each CPU module.
Monitor and record each production process from multiple angles to conduct multi-angle analysis.

CPU module
Ethernet
PoE HUB
Stores recorded files
NAS (Network-attached storage)
PC
Network cameras
Trouble
Bottle placement
Liquid filling
Capping
I see the film labeler is having trouble.
Film labeling
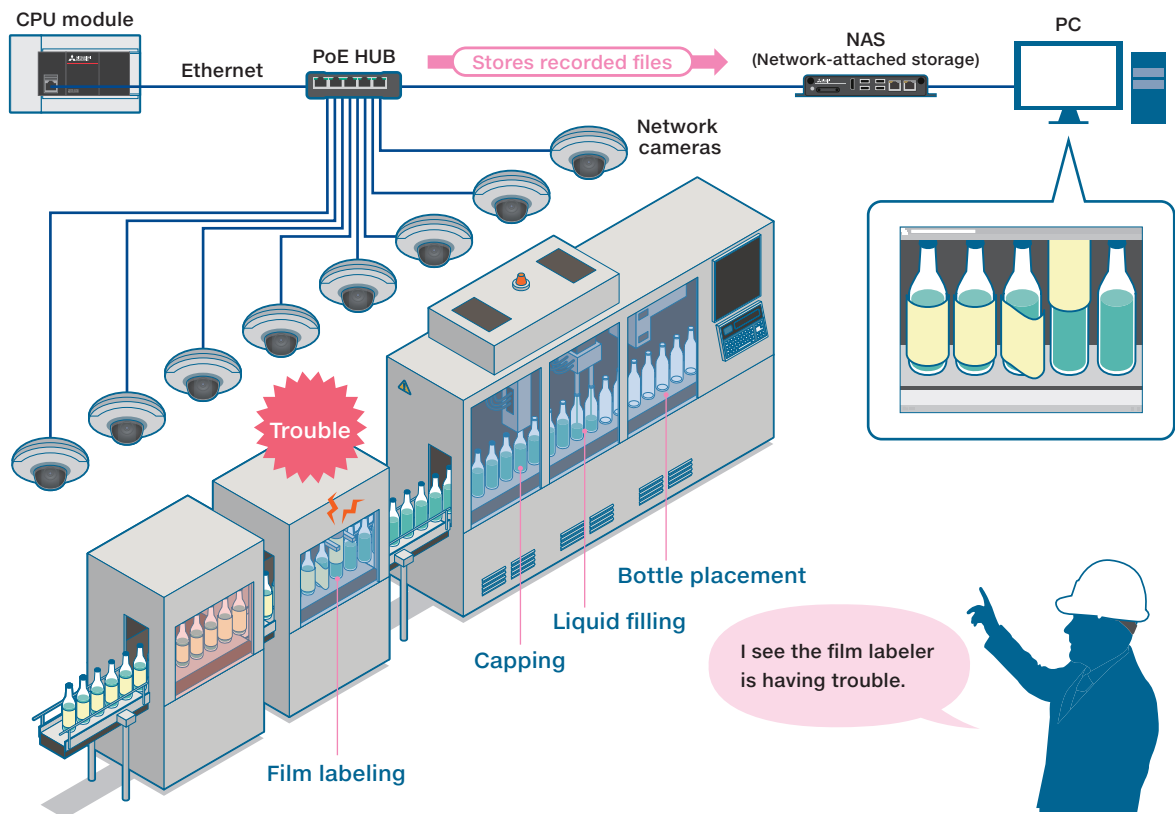
▋ Compatible with a various types of network cameras

The MELSEC iQ-F series connects to a variety of network cameras.
Use the cameras that best suit your needs.

Compatible network cameras by AXIS*[1]

Camera type	Series	Number of compatible models
Fixed box network camera	Q16, P13, M11, M10	22
Fixed bullet network camera	Q17, P14, M20	10
Fixed dome network camera	Q36, Q35, P33, P32, M42, M32, M31-L, M30	42
Pan/Tilt/Zoom (PTZ) network camera*[2]	Q62, Q61, Q60, P56, P54, M55, M50, V59, Q86, Q87	26
Panoramic network camera	Q60, Q37, P38, P37, M30	10
Moduler network camera	FA, F, P12	10
Thermal camera	Q19, P12	6

126 models total

*1: Compatible with the network camera firmware Ver. 6.50.4.2 and later. See right for details.
*2: The camera recording package does not support the pan/tilt/zoom function.

Technical Bulletin
Network cameras supporting
the Camera recording package
FA-A-0306

12

13 To introduce safer controls to your equipment

On-site issues

- Preventive measures should be taken on the equipment so that the equipment will cause no personal injury by any chance, creating an environment where the staff members can work safely.
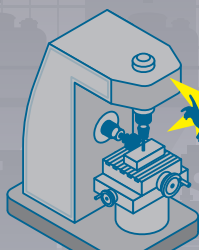- It takes time and effort to create a safety program. Need a way study how to introduce it easily and quickly.

[Before introduction]

> If a machine caused a personal injury, a manufacturer of the machine will be accused!

> We want to introduce safety controls, but we have no know-how to create safety control programs.

MELSEC iQ-F series safety extension module solves your problem

MELSEC iQ-F safety extension module FX5U FX5UC FX5UJ

Quick Start

- **The safety extension module will enable an easy introduction of safety system!**
- **No safety program is required! Its built-in logic will allow safety controls to be realized easily.**

[After introduction]

POINT1 Easily create a system just by connecting a safety extension module.

There is no need for wiring such as the one needed for monitoring the safety status or the wiring needed between relays when constructing a system with safety relays.

Before
Safety emergency stop button
Safety light curtains
Logic wiring
Safety relay module 1
Safety relay module 2
Wiring for safety control monitoring

After
Safety emergency stop button
Safety light curtains
Simply connect it to your CPU module!
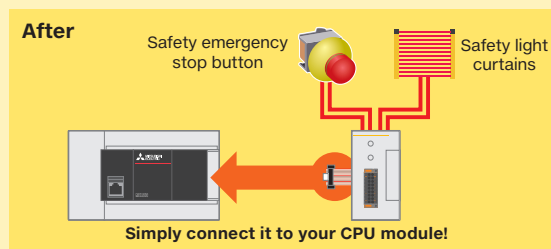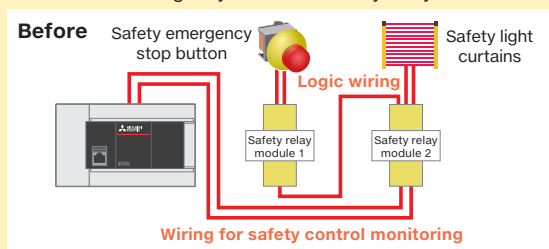
POINT2 Turn the rotary switch to select the built-in program

FX5-SF-MU4T5
FX5-SF-8DI4

FUNCTION Rotary switch
INPUT A Rotary switch
INPUT B Rotary switch

Safety main module FX5-SF-MU4T5
Safety input expansion module FX5-SF-8DI4

Rotary switch
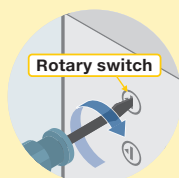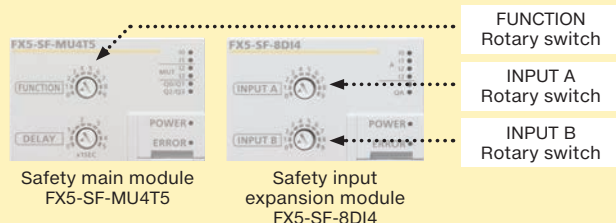
Just turn the switch with a precision screwdriver or a similar tool!
Nine types of built-in programs!

Benefits

▶ The safety system could be simply introduced only by connecting the FX5U/FX5UC CPU module to the CPU module with no safety program required.

▶ Any complicated monitor wiring with a general control PLC is not required, and the wiring is simple and easy to understand.

Outline of MELSEC iQ-F safety extension module product specifications

	Maximum number of connectable modules	Number of safety inputs	Number of safety outputs	Program for a safety control
Safety main module **FX5-SF-MU4T5**	**1** module	**4** points (dual-channel: 2 points)	**4** points (dual-channel: 2 points)	**9** types
Safety input expansion module **FX5-SF-8DI4**	**2** modules	**8** points (dual-channel: 4 points)	—	**9** types

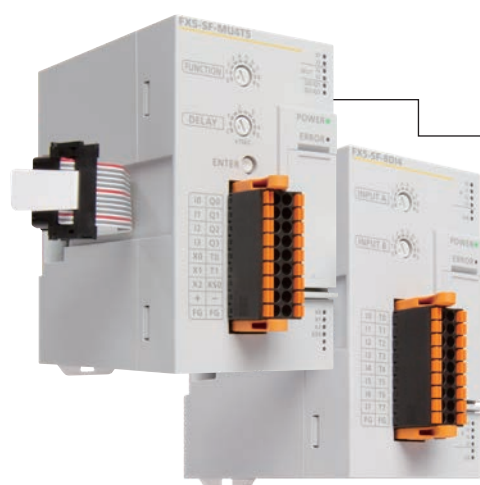|	Safety main module FX5-SF-MU4T5	Safety input expansion module FX5-SF-8DI4
Off delay time	0/0.5/1/1.5/2/2.5/3/3.5/4/5 s	—
External dimensions W × H × D (mm)	50 × 90 × 102.2	
Safety integrity level	SIL3 (IEC 61508)/SILCL 3 (IEC 62061)	
Performance level	PL e (DIN EN ISO 13849-1)	
Compatible CPU module	FX5UJ/FX5U/FX5UC CPU module	

A wide variety of safety PLCs/safety controllers

Safety control devices to meet your requirements

Selection points

Appropriate devices according to the system scale and scalability are available.

Scalability ↑

MELSEC iQ-R series
- Medium- to large-scale control for the production line and distributed system
- Integrated general and safety control
- Coordination with drives through CC-Link IE TSN

MELSEC-WS Series
- Easily incorporate safety control to the existing equipment
- Fast shut off function realizes 8 ms response
- Flexibly configure logic control with various components

MELSEC iQ-F series
- Easily configure safety control of the small-scale equipment
- Safety program and wiring for safety control monitoring are unnecessary, reducing system configuration time

0   8   16   24   144   4800 [point]

→ System size

Safety Programmable Controller/ Safety Controller L(NA)08192E

Safety extension module + driving device gives a low-cost solution for a safety system

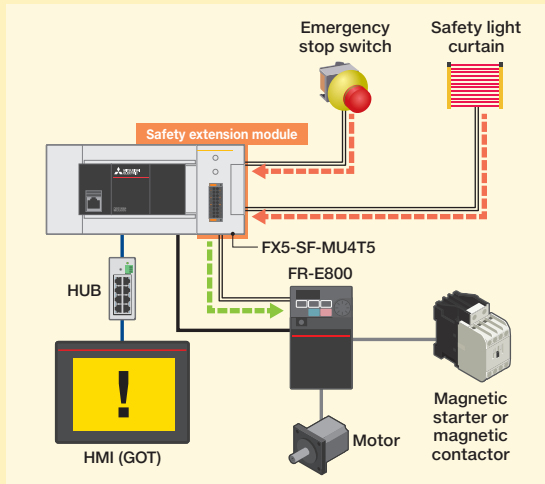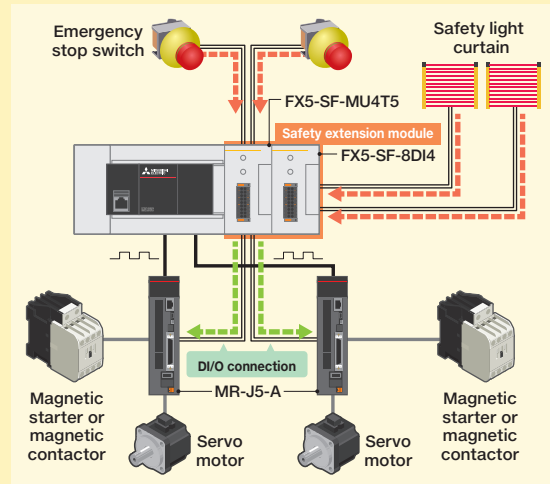A combined use of the safety extension module and a driving device* with the safe torque off (STO) function is an inexpensive solution for stepping up safety.

System configuration example (inverter)

- Emergency stop switch
- Safety light curtain
- Safety extension module
- FX5-SF-MU4T5
- HUB
- FR-E800
- HMI (GOT)
- Motor
- Magnetic starter or magnetic contactor

System configuration example (servo)

- Emergency stop switch
- Safety light curtain
- FX5-SF-MU4T5
- Safety extension module
- FX5-SF-8DI4
- DI/O connection
- MR-J5-A
- Magnetic starter or magnetic contactor
- Servo motor
- Servo motor
- Magnetic starter or magnetic contactor

Control cable ━━━ Safety signal ◀---- STO ◀----

[What is Safe torque off (STO) function?]

Responding to the input signal from external equipment, the STO function shuts off power to the servo motor electronically using the internal circuit (shuts off through secondary-side output).
This function corresponds to the Stop category 0 of IEC/EN 60204-1.

Speed
V
Stop category 0
(Uncontrolled stop)
Function actuation zone
Speed
Time
STO signal (B-contact)
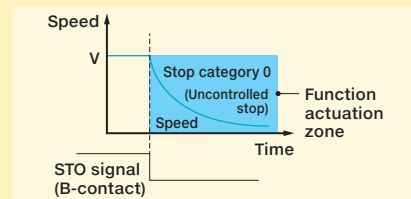
*: Driving devices that are hard-wired to receive STO signals only

Diagnostic function

A maximum of 16 errors will be logged in the buffer memory of the safety extension module for troubleshooting. The diagnostic function of GX Works3 provides information about and measures for the errors.

Detailed Information	Error area information	Failure information
	Error classification:Error code 2	command:3
Cause	The configuration of the module is incorrect.	
Corrective Action	Check the setting of the rotary switch and wiring.	
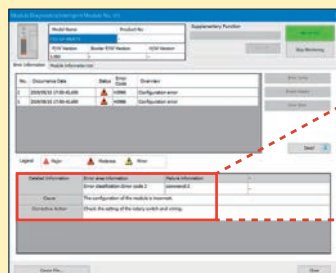
Module diagnostics screen

A lineup of driving devices

In addition to featuring the STO function, FR-E800-SCE (inverter) and MR-J5-G-RJ (AC servo) are standard-equipped with other safety functions, eliminating the need for wiring add-on safety devices and helping to build a simpler system.

[Inverter 800 series]
List of Safety Sub-Functions*1*2

	Inverter	FR-E800-SCE	FR-E800/E800-E	FR-A800/F800
STO	Safe torque off	Cat. 3 PL e, SIL 3	Cat. 3 PL d, SIL 2	Cat. 3 PL e, SIL 3
SS1	Safe stop 1 ramp monitored	Cat. 3 PL e, SIL 3	–	–
SBC	Safe brake control	Cat. 3 PL e, SIL 3	–	–
SLS	Safety-limited speed	Cat. 3 PL e, SIL 3	–	–
SSM	Safe speed monitor	Cat. 3 PL e, SIL 3	–	–

*1: The use of the functions may require certain specifications to be met. For detail, see the operation manual of the applicable model (functional safety edition).
*2: To meet the safety standards, inverters must be used with a safety module certified to meet ISO 13849-1 safety category 3 or higher standard.

L(NA)06075ENG   L(NA)06131ENG

See the catalogs shown above for the details of 800 series.

[AC Servo System MELSERVO-J5 series]
List of Safety Sub-Functions*1*2

Servo amplifier		MR-J5-G MR-J5-A	MR-J5-G(4)-RJ MR-J5D1-G4 MR-J5D2-G4 MR-J5D3-G4 *3*4		MR-J5W2-G MR-J5W3-G *3*4*5
Servo motor		• Servo motor with functional safety • Rotary servo motor • Linear servo motor • Direct drive servo motor	• Servo motor with functional safety	• Rotary servo motor • Linear servo motor • Direct drive servo motor	• Servo motor with functional safety • Rotary servo motor • Linear servo motor • Direct drive servo motor
STO	Safe torque off	Cat. 3 PL e, SIL 3	Cat. 4 PL e, SIL 3	Cat. 4 PL e, SIL 3	Cat. 4 PL e, SIL 3
SS1-t	Safe stop 1 time controlled	–	Cat. 4 PL e, SIL 3	Cat. 4 PL e, SIL 3	Cat. 4 PL e, SIL 3
SS1-r*6	Safe stop 1 ramp monitored	–	Cat. 4 PL e, SIL 3	Cat. 3 PL d, SIL 2	–
SS2-t*6	Safe stop 2 time controlled	–	Cat. 4 PL e, SIL 3	–	–
SS2-r*6	Safe stop 2 ramp monitored	–	Cat. 4 PL e, SIL 3	–	–
SOS*6	Safe operating stop	–	Cat. 4 PL e, SIL 3	–	–
SBC*6	Safe brake control	–	Cat. 4 PL e, SIL 3	Cat. 4 PL e, SIL 3	Cat. 4 PL e, SIL 3
SLS*6	Safety-limited speed	–	Cat. 4 PL e, SIL 3	Cat. 3 PL d, SIL 2	–
SSM*6	Safe speed monitor	–	Cat. 4 PL e, SIL 3	Cat. 3 PL d, SIL 2	–
SDI*6	Safe direction	–	Cat. 4 PL e, SIL 3	Cat. 3 PL d, SIL 2	–
SLI*6	Safety-limited increment	–	Cat. 4 PL e, SIL 3	–	–
SLT	Safety-limited torque	–	Cat. 3 PL d, SIL 2	Cat. 3 PL d, SIL 2	–

*1: The table above shows the case of DI/O connection (CN8). See the MELSERVO-J5 catalog for information regarding network connection.
*2: For 200 V class servo amplifiers, the firmware version B2 or later is required.
*3: When DI/O connection (CN8) is used, a diagnosis using test pulses is required to meet Category 4 PL e, SIL 3.
*4: The listed safety levels are applicable when a safety CPU or a safety controller that meets Category 4 PL e, SIL 3 executes safety sub-function control. When a forced stop switch, a safety switch, or an enable switch is directly connected to the servo amplifier, the safety level is Category 3 PL d, SIL 2.
*5: The safety sub-functions are supported by MR-J5W manufactured in November 2019 or later.
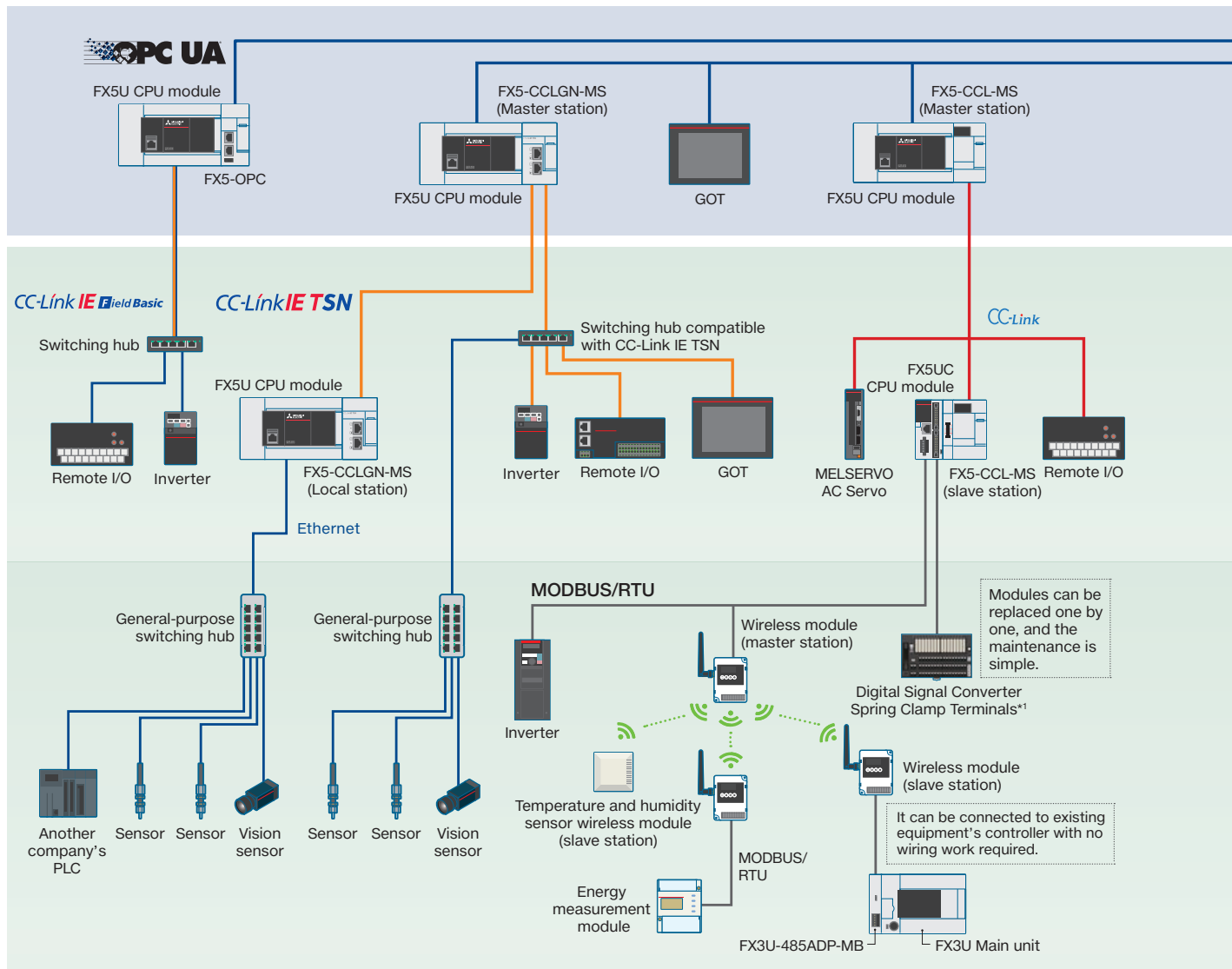*6: A fully closed loop system does not support SS1-r, SS2, SOS, SLS, SSM, SDI, and SLI.

L(NA)03179ENG

See the catalog shown above for the details of MELSERVO-J5.

Expanding connection cooperation for easy-to-connect MELSEC iQ-F series

(examples of its system configurations)

OPC UA

FX5U CPU module
FX5-OPC

FX5-CCLGN-MS
(Master station)
FX5U CPU module

GOT

FX5-CCL-MS
(Master station)
FX5U CPU module

CC-Link IE Field Basic
CC-Link IE TSN
CC-Link

Switching hub

FX5U CPU module

Switching hub compatible
with CC-Link IE TSN

FX5UC
CPU module

Remote I/O   Inverter

FX5-CCLGN-MS
(Local station)

Inverter   Remote I/O   GOT

MELSERVO
AC Servo

FX5-CCL-MS
(slave station)   Remote I/O

Ethernet

MODBUS/RTU

Modules can be
replaced one by
one, and the
maintenance is
simple.

General-purpose
switching hub

General-purpose
switching hub

Wireless module
(master station)

Digital Signal Converter
Spring Clamp Terminals*1

Inverter

Wireless module
(slave station)

Another
company's
PLC

Sensor   Sensor   Vision
sensor

Sensor   Sensor   Vision
sensor

Temperature and humidity
sensor wireless module
(slave station)

It can be connected to existing
equipment's controller with no
wiring work required.

MODBUS/
RTU

Energy
measurement
module

FX3U-485ADP-MB   FX3U Main unit

With its strengthened cooperation with various FA devices and sensors, it can be connected to them easily. For details about the products of our company and our partner manufacturers, please contact your local Mitsubishi Electric sales office or representative.

FA devices

Mitsubishi Electric
Corporation
Programmable Controller
MELSEC iQ-R series
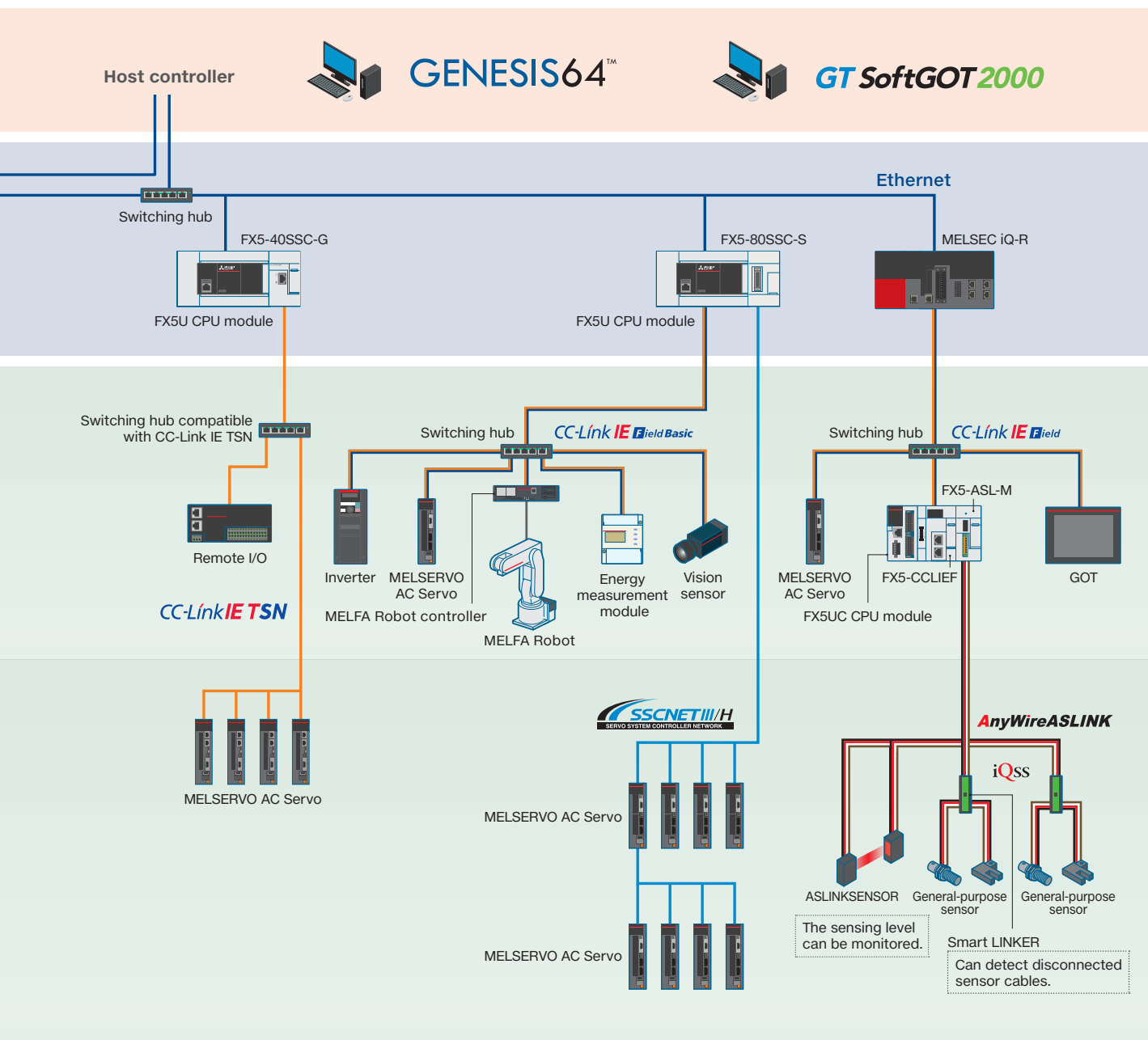
GOT Mobile
GOT Drive
GT SoftGOT 2000

Mitsubishi Electric
Corporation
GOT

Mitsubishi Electric
Corporation
Industrial/
Collaborative Robots
MELFA

Mitsubishi Electric
Corporation
AC Servo MELSERVO

Host controller

GENESIS64™

GT SoftGOT 2000

Ethernet

Switching hub

FX5-40SSC-G

FX5U CPU module

FX5-80SSC-S

FX5U CPU module

MELSEC iQ-R

Switching hub compatible with CC-Link IE TSN

Switching hub — CC-Link IE Field Basic

Switching hub — CC-Link IE Field

FX5-ASL-M

Remote I/O

Inverter   MELSERVO AC Servo

MELFA Robot controller

Energy measurement module

Vision sensor

MELSERVO AC Servo

FX5-CCLIEF

GOT

CC-Link IE TSN

FX5UC CPU module

MELFA Robot

SSCNET III/H
SERVO SYSTEM CONTROLLER NETWORK

AnyWireASLINK

iQss

MELSERVO AC Servo

MELSERVO AC Servo

MELSERVO AC Servo

ASLINKSENSOR   General-purpose sensor   General-purpose sensor

The sensing level can be monitored.

Smart LINKER

Can detect disconnected sensor cables.

*1: Manufactured by Mitsubishi Electric Engineering CO., LTD.

GENESIS64™

Mitsubishi Electric Corporation SCADA GENESIS64™

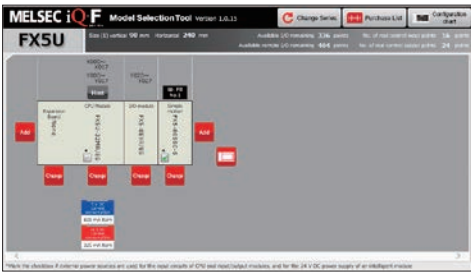Mitsubishi Electric Corporation Inverter

Mitsubishi Electric Corporation Energy measurement module

Quick Start IoT Leaflet

MELSEC iQ-F series model selection tool will help you to select their models.

Without referring to catalogs and manuals, you can easily check how to combine products and perform various calculations required when you select models.
Also, you can create your "purchasing list" which is useful when you request a purchase quote.

Global FA Center

Mitsubishi Electric Corporation FA Centers support all our customers and users of MELSEC iQ-F Series all over the world.
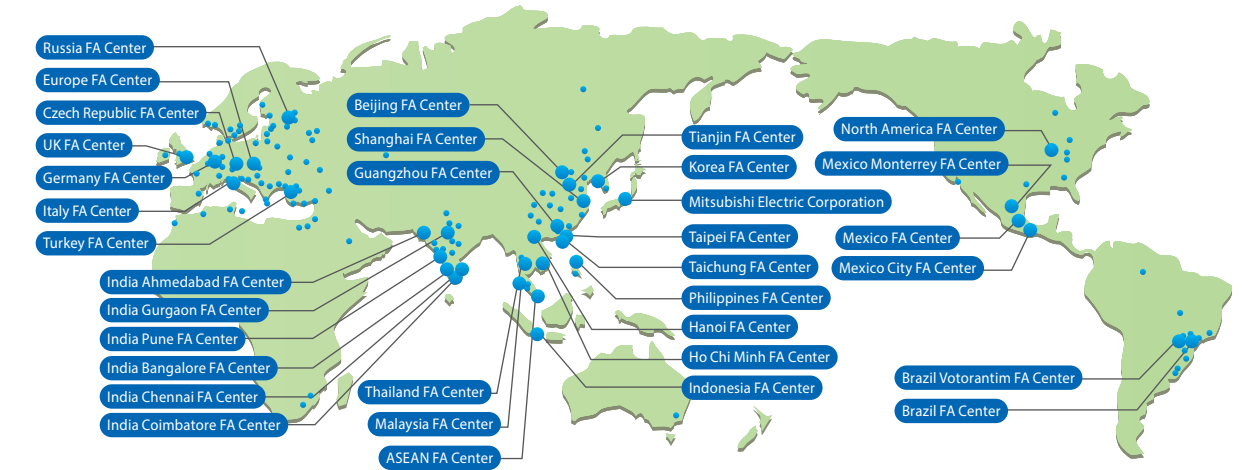
Japan (Tokyo)	FA Global Solution Technical Department	(TEL:+81-3-3218-6422)
Japan (Tokyo)	Asian Business Development Department	(TEL:+81-3-3218-6284)
China (Shanghai)	Mitsubishi Electric Automation (China) Ltd. Shanghai FA Center	(TEL:+86-21-2322-3030)
China (Beijing)	Mitsubishi Electric Automation (China) Ltd. Beijing Branch Beijing FA Center	(TEL:+86-10-6518-8830)
China (Tianjin)	Mitsubishi Electric Automation (China) Ltd. Tianjin Branch Tianjin FA Center	(TEL:+86-22-2813-1015)
China (Guangzhou)	Mitsubishi Electric Automation (China) Ltd. Guangzhou Branch Guangzhou FA Center	(TEL:+86-20-8923-6730)
Taiwan (Taichung)	Mitsubishi Electric Taiwan Co., Ltd.	(TEL:+886-4-2359-0688)
Taiwan (Taipei)	Setsuyo Enterprise Co., Ltd.	(TEL:+886-2-2299-9917)
Korea	Mitsubishi Electric Automation Korea Co., Ltd.	(TEL:+82-2-3660-9632)
ASEAN	Mitsubishi Electric Asia Pte. Ltd.	(TEL:+65-6470-2475)
Malaysia	MITSUBISHI ELECTRIC SALES MALAYSIA SDN. BHD.	(TEL:+60-3-7626-5080)
Indonesia	PT. Mitsubishi Electric Indonesia Cikarang Office	(TEL:+62-21-2961-7797)
Vietnam (Hanoi)	Mitsubishi Electric Vietnam Company Limited Hanoi Branch Office	(TEL:+84-4-3937-8075)
Vietnam (Ho Chi Minh)	Mitsubishi Electric Vietnam Company Limited	(TEL:+84-8-3910-5945)
Thailand	Mitsubishi Electric Factory Automation (Thailand) Co., Ltd.	(TEL:+66-2682-6522 to 31)
Philippines	MELCO Factory Automation Philippines Inc.	(TEL:+63-(0)2-8256-8042)
India (Pune)	Mitsubishi Electric India Pvt. Ltd. Pune Branch	(TEL:+91-20-2710-2000)
India (Gurgaon)	Mitsubishi Electric India Pvt. Ltd. Gurgaon Head Office	(TEL:+91-124-463-0300)

India (Bangalore)	Mitsubishi Electric India Pvt. Ltd. Bangalore Branch	(TEL:+91-80-4020-1600)
India (Chennai)	Mitsubishi Electric India Pvt. Ltd. Chennai Branch	(TEL:+91-4445548772)
India (Ahmedabad)	Mitsubishi Electric India Pvt. Ltd. Ahmedabad Branch	(TEL:+91-7965120063)
India (Coimbatore)	Mitsubishi Electric India Pvt. Ltd. Coimbatore Branch	(TEL:+91-422-4385606)
North America	Mitsubishi Electric Automation, Inc.	(TEL:+1-847-478-2100)
Mexico	Mitsubishi Electric Automation, Inc. Queretaro Office	(TEL:+52-442-153-6014)
Mexico (Mexico City)	Mitsubishi Electric Automation, Inc. Mexico Branch	(TEL:+52-55-3067-7511)
Mexico (Monterrey)	Mitsubishi Electric Automation, Inc. Monterrey Office	(TEL:+52-55-3067-7521)
Brazil	Mitsubishi Electric do Brasil Comércio e Serviços Ltda.	(TEL:+55-11-4689-3000)
Brazil (Votorantim)	MELCO CNC do Brasil Comercio e Servicos S.A.	(TEL:+55-15-3023-9000)
Europe	Mitsubishi Electric Europe B.V. Polish Branch	(TEL:+48-12-347-65-00)
Germany	Mitsubishi Electric Europe B.V. German Branch	(TEL:+49-2102-486-0)
UK	Mitsubishi Electric Europe B.V. UK Branch	(TEL:+44-1707-27-8780)
Czech Republic	Mitsubishi Electric Europe B.V. Czech Branch	(TEL:+420-255 719 200)
Italy	Mitsubishi Electric Europe B.V. Italian Branch	(TEL:+39-039-60531)
Russia	Mitsubishi Electric (Russia) LLC St. Petersburg Branch	(TEL:+7-812-633-3497)
Turkey	Mitsubishi Electric Turkey A.S. Umraniye Branch	(TEL:+90-216-526-3990)

⚠ Safety Warning

· To ensure proper use of the products in this document, please be sure to read the instruction manual prior to use.

Registration

MITSUBISHI ELECTRIC CORPORATION

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www.MitsubishiElectric.com